ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

1407 W North Temple, Suite 330
Salt Lake City, Utah 84114

August 23, 2021

VIA ELECTRONIC FILING

Utah Public Service Commission
Heber M. Wells Building, 4th Floor
160 East 300 South
Salt Lake City, UT 84114

Attention: Gary Widerburg
Commission Administrator

RE: **Docket No. 20-035-34 – In the Matter of the Application of Rocky Mountain Power's Application for Approval of Electric Vehicle Infrastructure Program**

Rocky Mountain Power hereby submits for filing this Application and Motion for Protective Order ("Application") to the Public Service Commission of Utah ("Commission"), pursuant to section 54-4-41 of the Utah Code, also known as House Bill 396 (2020) – Electric Vehicle Charging Infrastructure Amendments, requesting approval of the Company's Electric Vehicle Infrastructure Program ("EVIP") authorized by the statute.

Rocky Mountain Power respectfully requests that all formal correspondence and requests for additional information regarding this filing be addressed to the following:

By E-mail (preferred): datarequest@pacificorp.com
jana.saba@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah, Suite 2000
Portland, OR 97232

Informal inquiries may be directed to Jana Saba at (801) 220-2823.

Sincerely,

Joelle Steward
Vice President, Regulation

Enclosures

CC: Service List Docket No. 20-035-34

CERTIFICATE OF SERVICE

Docket No. 20-035-34

I hereby certify that on August 23rd, 2021, a true and correct copy of the foregoing was served by electronic mail to the following:

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Attorneys for Rocky Mountain Power

BEFORE THE PUBLIC SERVICE COMMISSION OF UTAH

In the Matter of the Application of Rocky Mountain Power for Approval of Electrical Vehicle Infrastructure Program	))))))	Docket No. 20-035-34

APPLICATION FOR APPROVAL OF ELECTRIC VEHICLE INFRASTRUCTURE PROGRAM AUTHORIZED BY ELECTRIC VEHICLE CHARGING INFRASTRUCTURE AMENDMENTS AND MOTION FOR PROTECTIVE ORDER

PacifiCorp, dba Rocky Mountain Power ("Rocky Mountain Power" or the "Company"), hereby submits this Application ("Application") to the Public Service Commission of Utah ("Commission"), pursuant to section 54-4-41 of the Utah Code, also known as House Bill 396 (2020) – Electric Vehicle Charging Infrastructure Amendments, requesting approval of the Company's Electric Vehicle Infrastructure Program ("EVIP") authorized by the statute.

In addition, pursuant to Utah Administrative Rule R746-1-602(2), the Company requests that the Commission enter a Protective Order denying all intervening parties

access to the information and materials designated by Rocky Mountain Power as "Confidential" in this matter.

With this Application, the Company is seeking Commission authorization for:

A. The implementation of the EVIP, as described in Rocky Mountain Power's Transportation Plan for the Electric Vehicle Charging Infrastructure Program, contained in Exhibit RMP___(JAC-1), which allows funding from the Company's customers up to $50 million for all costs and expenses associated with the deployment of utility-owned electric vehicle charging infrastructure and vehicle charging service provided by the Company, pursuant to Utah Code section 54-4-41(2);

B. Beginning January 1, 2022, the implementation of a new Electric Service Schedule No. 198 - Electric Vehicle Infrastructure Program (EVIP) Cost Adjustment, ("Schedule 198") through which the Company will collect $5 million per year for 10 years with percentage increases applied to the Power Charge, Energy Charge, Facilities Charge, Back-Up Power Charge, Excess Power Charge, Daily Power Charge and Voltage Discount;

C. The approval to establish a balancing account that reflects the costs of the Company's prudent investments in the EVIP, offset by the collections through Schedules 60 and 198, and a carrying charge, provided for in Utah Code section 54-4-41(6);

D. Beginning January 1, 2022, the implementation of the new Electric Service Schedule No. 60 - Company Operated Electric Vehicle Charging Station Service ("Schedule 60"), which lists the prices and details for the electric vehicle charging stations owned by the Company,

E. A six-month extension of Electric Service Schedule No. 2E – Residential Service – Electric Vehicle Time-of-Use Pilot Option – Temporary ("Schedule 2E"),

which will extend the automatic termination of the tariff from January 1, 2022, to June 30, 2022, and

F. The extension of Electric Service Schedule No. 120 - Plug-in Electric Vehicle Incentive Pilot Program ("Schedule 120") throughout the duration of the EVIP, which is a custom incentive program originally created under the Sustainable Transportation and Energy Plan ("STEP") pilot program that is scheduled to terminate January 1, 2022.

In support of this Application, Rocky Mountain Power states as follows:

1. Rocky Mountain Power is a division of PacifiCorp, an Oregon corporation, that provides electric service to retail customers in the states of Utah, Wyoming, and Idaho. Rocky Mountain Power is a public utility in the state of Utah and is subject to the Commission's jurisdiction with respect to its prices and terms of electric service to retail customers in Utah. The Company serves approximately 948,000 customers in Utah. Rocky Mountain Power's principal place of business in Utah is 1407 West North Temple, Suite 320, Salt Lake City, Utah 84116.

2. Communications regarding this Application should be sent to:

Jana Saba
Utah Regulatory Affairs Manager
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1407 West North Temple, Suite 330
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Email: jana.saba@pacificorp.com

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In addition, the Company respectfully requests that all data requests regarding this matter be addressed to:

By e-mail (preferred): datarequest@pacificorp.com

By regular mail: Data Request Response Center
PacifiCorp
825 NE Multnomah St, Suite 2000
Portland, Oregon 97232

Informal inquiries related to this Application may be directed to Jana Saba, Utah Regulatory Affairs Manager, at (801) 220-2823.

PREFILED TESTIMONY

3. As support for this Application, the Company files herewith the testimony and exhibits of James A. Campbell, Innovation and Sustainability Policy Director, and Robert M. Meredith, Director, Pricing and Cost of Service. Mr. Campbell's testimony will describe the goals and elements of the EVIP, and he will discuss how the program satisfies the requirements of Utah Code section 54-4-41. Mr. Meredith's testimony will describe the Company's two new proposed tariffs, Schedule 60 and Schedule 198. Mr. Meredith will also discuss the Company's recommendation to temporarily extend Schedule 2E and extend Schedule 120 for the life of the EVIP.

APPLICATION PREREQUISITE – CONSIDERATION OF INPUT

4. Utah Code section 54-4-41(3) requires the Company to seek and consider input regarding the EVIP from various state agencies,[1] third-party electric vehicle battery charging service operators, and any other person who files a notice with the Commission.

[1] The state agencies are the Division of Public Utilities, the Office of Consumer Services, the Division of Air Quality, the Department of Transportation, the Governor's Office of Economic Development, the Office of Energy Development, the board of the Utah Inland Port Authority, and representatives of the Point of the Mountain State Land Development Authority. *See* Utah Code Ann. § 54-4-41(3)(a) – (h).

In compliance with this provision, Rocky Mountain Power filed a notice of intent with the Commission on August 27, 2020, requesting the Commission issue a public notice of an initial input meeting via conference call, which was then held on September 24, 2020. In addition, the Company held a second input meeting via conference call on June 29, 2021. The Company invited participants at the meetings to provide suggestions and input to the Company regarding the EVIP. Rocky Mountain Power has considered the feedback it has received in the development of the EVIP.

EVIP OVERVIEW

5. The EVIP will enable the deployment of utility-owned electric vehicle charging infrastructure and vehicle charging service provided by the Company, pursuant to Utah Code section 54-4-41. The specific goals of the EVIP are to (1) increase electric vehicle adoption in the state of Utah; and (2) operate as an efficient and low-cost infrastructure program that ultimately adds revenue to the system. These goals are more fully discussed in the testimony of Mr. Campbell and in Exhibit RMP___(JAC-1).

6. There are four elements of EVIP through which these goals will be achieved. The elements are briefly described below and are fully described in the testimony of Mr. Campbell and in Exhibit RMP___(JAC-1).

i. Company-Owned Chargers – The Company will invest in 20 – 25 charging station locations during the first five years of the program. The locations will contain between two and six direct current ("DC") fast chargers, designed to charge at 350 kilowatts ("kW"), 150 kW, and 50 kW for legacy vehicles. The Company coordinated with the Utah Department of Transportation ("UDOT") and Utah State University ("USU") to identify

statewide charging station location needs, and it has proposed 20 communities as potential sites for Company-owned chargers. The potential sites were evaluated using criteria described in Exhibit RMP___(JAC-1) to determine if the proposed communities were appropriate for EV infrastructure. The final locations of the sites will be determined following detailed engineering and market evaluations. The Company plans to issue a Request for Proposals ("RFP") to select an operator to establish the network of Company-owned chargers.

ii. Make-ready Infrastructure – The Company will provide an application process for customers to seek Company investment in make-ready infrastructure systems, which generally includes all the necessary electrical infrastructure between the utility grid interconnection and the chargers, such as stepdown transformers, electric service panels, conduit, conductors, switchgear and power conditioning units, mounting pads or brackets, trenching, boring, and other such elements. Non-Company EV charging operators are eligible to apply for make-ready infrastructure investments.

iii. Incentives – The Company proposes to continue the incentives that have been offered through the STEP program under Schedule 120 since 2017. The incentives cover a portion of the costs for customers to install electric vehicle chargers and they have been popular and effective in increasing charging infrastructure in the service territory. Schedule 120 is set to terminate on January 1, 2022, with the expiration of the STEP program and the Company hereby requests an extension of Schedule 120 for the duration

of the EVIP. The Company plans to utilize the same process that is currently in place for EV infrastructure incentives.

iv. Innovation Partnerships and Projects – The Company recognizes that as EV charging technology advances, it will be important for the EVIP to stay current and evaluate implementation of the latest technology. In addition to monitoring advances in technology, the Company will also participate in several studies and projects, such as the Freight Logistics Electrification Demonstration project, which involves a collaboration between USU, UDOT and the Inland Port Authority to electrify heavy-duty freight and hauling operations within the Inland Port, and the WestSmatEV@Scale project, a grant-funded program through the Department of Energy to create an enduring regional electric vehicle ecosystem across the West. The Company will also continue to explore technology developed from the Intermodal Hub project, a STEP-funded project with USU, studying the potential for a power balance and control system at Utah Transit Authority's ("UTA") Central Station.

RATES AND PROPOSED TARIFFS

Schedule 198 – Electric Vehicle Infrastructure Program Cost Recovery

7. Utah Code section 54-4-41(2)(a) allows the Commission to authorize the EVIP and to authorize the Company to implement tariffs to provide funding for the program for a maximum of $50 million. The funding is for all costs and expenses associated with the deployment of utility-owned vehicle charging infrastructure and vehicle charging service provided by the Company. *See* Utah Code Ann. § 54-4-41(2)(a).

Pursuant to this section, the Company submits with this Application proposed Schedule 198 – Electric Vehicle Infrastructure Program Cost Recovery, included as Exhibit RMP___(RMM-1) to this Application. Schedule 198 is discussed in the testimony of Mr. Meredith.

8. Through Schedule 198, the Company will collect $5 million per year for 10 years and the costs of the EVIP will be spread to customer classes as an equal percentage of total base revenue. Rates were designed as percentage increases to the Power Charge, Energy Charge, Facilities Charge, Back-Up Power Charge, Excess Power Charge, Daily Power Charge and Voltage Discount. Furthermore, the Company will periodically monitor its collection pursuant to Schedule 198 to ensure that it does not collect more than the $50 million authorized by the statute.

Schedule 60 – Company Operated Electric Vehicle Charging Station Service

9. Utah Code section 54-4-41(2)(c) authorizes the Company to create a new customer class with an electric vehicle charging service rate structure that (1) is determined by the Commission to be in the public interest, (2) is a transitional rate structure expected to allow the Company to recover its costs full cost of service over a reasonable time frame, and (3) may allow different rates for large-scale customers. Pursuant to this section, the Company submits with this Application proposed tariff Schedule 60 – Company Operated Electric Vehicle Charging Station Service, included as Exhibit RMP ___(RMM-1) to this Application. Schedule 60 and the basis for the prices therein are fully described in the testimony of Mr. Meredith.

10. The proposed rate structure in Schedule 60 is as follows:

	Non-RMP Customer	RMP Customer
DC Fast Charging:	$0.40 per kWh	$0.15 per kWh
Level 2 Charging up to 19 kW:	$0.08 per kWh	
Off-Peak Discount:	-$0.05 per kWh	
Per Session Charge:	$1.00	

11. As the foregoing table demonstrates, individuals using Company-owned charging stations will be charged a session fee and an energy charge. The session fee is a charge assessed each time a user plugs into a charging station, and it is a charge the Company has determined is important to help recover the fixed costs associated with providing Company-owned charging stations. Energy charges for the use of DC fast chargers vary depending on whether the individual using the charging station is a customer of Rocky Mountain Power (above "RMP Customer") or not (above "Non-RMP Customer"). The Company proposes that RMP Customers receive a 75 percent discount in energy charge price because they will already be paying for the EVIP as part of their monthly bills through Schedule 198.

12. The Company has proposed in Schedule 60 that for the first five years of the program the prices will change by the same percentage as base retail price changes rounded to the nearest cent. From the sixth to the tenth years of the EVIP, the Company proposes that the prices listed in Schedule 60 transition to the cost of service.

13. To encourage individuals to make charging stations available as soon as their charging session is completion, the Company has included in Schedule 60 a provision allowing the Company to impose penalties on customers who fail to make the charging station available after their session is complete.

14. The rate structure proposed by the Company is consistent with Utah Code section 54-4-41(2)(c) because it is in the public interest and it is a transitional rate structure. The Company proposes a ten-year time frame for the transition to full cost of service. To accomplish this, the Company will begin including the Company's charging stations in the Company's cost of service studies starting in 2022[2], and it will begin adding annual pricing adjustments that move the pricing 20 percent toward cost-of-service in the sixth year, 40 percent in the seventh year, 60 percent in the eighth year, 80 percent in the ninth year, and 100 percent in the tenth year. The Company will also monitor and consider if changes to pricing are warranted in the first five years.

Schedule 2E – Residential Electric Vehicle Time of Use Pilot

15. Schedule 2E implements an optional time of use pilot for residential customers that can provide proof of electric vehicle registration. The pilot was authorized pursuant to the STEP program and took effect in 2017. The pilot was closed to new participants at the end of 2020 and at the end of 2021, the Company will submit a report addressing the costs and benefits of the program. Currently, Schedule 2E is set to terminate on January 1, 2022. The Company proposes to revise Schedule 2E to extend the termination date to June 30, 2022. The Company seeks the six-month extension to allow interested parties time to provide comments and evaluate whether the program should continue in some form or whether the program should terminate entirely on June 30, 2022. The Company submits with this Application the revised tariff Schedule 2E – Residential Electric Vehicle Time of Use Pilot, included as Exhibit RMP___(RMM-1) to this Application.

[2] The cost of service study for calendar year 2022 will be filed June 15, 2023.

Schedule 120 – Plug-in Electric Vehicle Incentive Program

16. To implement the incentive element of the EVIP, the Company proposes to continue the incentives offered under Schedule 120, which is currently set to terminate January 1, 2022. The incentives cover a portion of the costs for customers to install electric vehicle chargers and have been effective in increasing charging infrastructure in the service territory. The Company requests that Schedule 120 be extended for the duration of the EVIP. The Company submits with this Application the revised tariff Schedule 120 – Plug-in Electric Vehicle Incentive Program, included as Exhibit RMP___(RMM-1) to this Application.

EVIP IS IN THE PUBLIC INTEREST

17. The EVIP satisfies Utah Code section 54-4-41(4) and is in the public interest because the program (a) increases the availability of electric vehicle battery charging service in the state; (b) enables the deployment of infrastructure that supports electric vehicle battery charging service and Company-owned charging stations in a manner expected to increase electric vehicle adoption; (c) includes an evaluation of investments in the areas of the jurisdictional land, defined in Utah Code section 11-58-102 (the Inland Port) and the point of the mountain land, defined in Utah Code section 11-59-102 (Point of Mountain); (d) enables competition, innovation, and customer choice in charging service, while promoting low-cost services for electric vehicle battery charging customers; and (e) provides for ongoing coordination with UDOT. *See* Utah Code Ann. § 54-4-41(a) – (e).

18. The EVIP will increase the availability of electric vehicle battery charging service in the state in two ways. First, Rocky Mountain Power will invest in 20 – 25

Company-owned charging stations that will be deployed throughout the state. As discussed previously, the network of Company-owned charging stations will be operated by an entity selected through the RFP process and will be strategically located to complete charging gaps throughout the state. Second, the Company will seek applications from interested customers for make-ready infrastructure to be deployed throughout the state.

19. The EVIP enables the significant deployment of infrastructure that supports battery charging service and Company-owned charging stations in a manner that is reasonably expected to increase electric vehicle adoption through ongoing coordination by the Company and UDOT to identify statewide charging needs along with potential locations for high volume electric vehicle users. This targeted process for the strategic selection of Company-owned charging station locations compliments existing charging stations to create a robust charging network in the state. Such a network is reasonably anticipated to increase electric vehicle adoption because it will address a significant concern that studies have shown to be a barrier in electric vehicle adoption, namely, the lack of availability of charging service and the fear of becoming stranded.

20. During the development of the EVIP, Rocky Mountain Power met with representatives from the Point of the Mountain Development Commission and the Utah Inland Port Authority to evaluate potential investments. The Company has signed Cooperation Agreements with both entities, and it will continue to work with the entities as required by section 54-4-41(4)(c) of the Utah Code.

21. The EVIP will enable competition, innovation, and customer choice in electric vehicle batter charging services, while promoting low costs. By increasing the availability of charging station locations throughout the state, the EVIP will provide

additional access to charging services for electric vehicle owners, as well as increase competition for charging services, through the deployment of both Company-owned charging stations and through make-ready infrastructure investments. The prices for charging service are competitive and the rates are discounted for Rocky Mountain Power customers. The reduced rates reflect the customers' contributions to the Company-owned infrastructure. The Company will ensure that infrastructure investments under the EVIP are innovative and employ the latest technology by continuing to partner and engage with leading experts in electric vehicle technology like USU, the University of Utah, the U.S. Department of Energy, the Utah Transit Authority, and the Utah Office of Energy Development.

22. The Company has been engaged in ongoing discussions and coordination with UDOT regarding the development of a statewide electric vehicle charging network since the conclusion of the 2020 legislative session, and UDOT has provided valuable input into the development of the EVIP. The Company and UDOT have agreed to continue their collaborative efforts as the EVIP is implemented, as required by Utah Code section 54-4-41(4)(e).

RECOVERY OF PRUDENTLY MADE INVESTMENT

23. Section 54-4-41(6) of the Utah Code provides that the Commission shall authorize recovery of the Company's investments in the EVIP through a balancing account or other ratemaking treatment that reflects (a) the EVIP's costs associated with prudent investment, including the Company's pre-tax average weighted cost of capital approved by the Commission in the Company's most recent general rate proceeding, and associated revenue and prudently incurred expenses, and (b) a carrying charge.

24. The Company's investment in the EVIP is prudent because the EVIP can reasonably be anticipated to result in projects that are in the public interest of the customers of Rocky Mountain Power to reduce transportation sector emissions over a reasonable time. *See* Utah Code Ann. § 54-4-41(7)(a). Specifically, the EVIP is anticipated to lead to increased electric vehicle use in the State of Utah, which will in turn lead to a reduction in transportation sector emissions. Through the deployment of Company-owned charging stations at strategic locations, the Company will help to create a robust charging network throughout the state. The creation of such a network is anticipated to increase electric vehicle adoption since one of the primary barriers to electric vehicle adoption is insufficient charging infrastructure.

25. The Company's investment in the EVIP satisfies the second prong of prudence because the EVIP can reasonably be anticipated to provide the customers of Rocky Mountain Power significant benefits that may include revenue from the electric vehicle charging service that offsets the Company's costs and expenses. *See* Utah Code Ann. § 54-4-41(7)(b). The Company anticipates that high volume users of charging services, such as fleets and medium and heavy-duty vehicles will generate revenue to offset the Company's costs and expenses.

26. The Company will also ensure that the investments in the EVIP are prudently made by facilitating any other measure the Commission determines will promote the deployment of utility-owned charging infrastructure and charging service or create significant long-term benefits to Rocky Mountain Power's customers. *See* Utah Code Ann. § 54-4-41(7)(c).

MOTION FOR PROTECTIVE ORDER

27. In support of this Application, the Company is submitting confidential commercial and financial information and trade secrets, which, if disclosed to the intervening parties, could be used to put the Company at a competitive disadvantage. Specifically, the Company is providing detailed estimates of its yearly expected expenditures, the per cost estimate for each charging station location, the estimated operating costs of the EVIP, and the Company's calculations of revenue breakeven at various utilization levels.

28. This information could be used by intervening parties during the performance of normal job functions to competitively disadvantage the Company. The information could be used by parties for competitive insight and advantage during the RFP process the Company will use to select an operator for the network of Company-owned chargers. Additionally, intervening parties may use the information to compete directly with Rocky Mountain Power as a provider of charging station locations.

29. Because the Company could be competitively disadvantaged if the intervening parties are permitted to review and receive the Company's confidential information, the Company requests that the Commission enter a Protective Order denying all intervening parties access to the information and materials designated as "Confidential," pursuant to Utah Administrative Rule R746-1-602(2).

30. The Company recognizes that the Commission, the Division of Public Utilities, the Office of Consumer Services, and counsel and staff of these agencies are entitled to receive and review all confidential information.

WHEREFORE, by this Application, Rocky Mountain Power respectfully requests that the Commission:

(1) approve this Application and authorize the EVIP,

(2) authorize the recovery of the Company's investments in the EVIP through a balancing account,

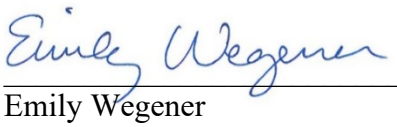
(3) approve the tariff sheets, as filed, with an effective date of January 1, 2022, and

(4) enter a Protective Order preventing intervening parties from receiving and reviewing information designated as "Confidential."

DATED this 23rd day of August 2021.

Respectfully submitted,

ROCKY MOUNTAIN POWER



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Attorneys for Rocky Mountain Power

REDACTED
Rocky Mountain Power
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

REDACTED
Direct Testimony of James A. Campbell

August 2021

Q. Please state your name, business address, and present position with PacifiCorp d/b/a Rocky Mountain Power ("PacifiCorp" or "Company").

A. My name is James Campbell. My business address is 1407 West North Temple, Salt Lake City, Utah, 84116. My present position is the Director of Innovation and Sustainability Policy.

Qualifications

Q. Please describe your education and professional background.

A. I have a Bachelor of Science in Materials Science and Engineering, a Master of Engineering in Environmental Engineering, and a Master of Business Administration all from the University of Utah. I have previously worked as an engineer with Foster Wheeler Corporation, Boston Scientific, and the Utah Division of Air Quality. In November 2007, I joined the Company as a Senior Environmental Policy Analyst, and I have also worked as a Legislative Policy Adviser in the Government Affairs group.

Q. What are your responsibilities?

A. My primary responsibilities include evaluating and implementing new innovative technologies, policies, and programs. I also lead the Company's strategic efforts with electric vehicles.

Q. Have you testified in previous regulatory proceedings?

A. Yes. I have previously filed testimony on behalf of the Company in regulatory proceedings in Utah.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present the Company's proposed Electric Vehicle Infrastructure Program ("EVIP"), as authorized in section 54-4-41 of the Utah Code.

Q. Please provide an overview of the EVIP.

A. Under the 2020 Utah House Bill (HB) 396, Electric Vehicle Charging Infrastructure Amendments, now codified in section 54-4-41 of the Utah Code, the Utah Legislature authorized the Company to create an EVIP, with a maximum funding from electric utility customers of $50 million for all costs and expenses. The EVIP funding is for the deployment of utility-owned vehicle charging infrastructure and vehicle charging service provided by the Company. A more detailed overview of the EVIP is included in the Company's Transportation Plan provided in Exhibit RMP___(JAC-1).

Q. When will the EVIP begin and how long will it last?

A. The Company intends to develop and administer the EVIP over a 10-year period, starting in 2022 and operating through the end of 2031. It is expected that after the initial 10-year period, there will be sufficient consumer demand for vehicle charging services to transition the program from its special status under section 54-4-41 to a traditional utility program. After the initial 10-year period, the Company is expected to provide vehicle charging services at the utility's cost of service and be able to provide net benefits to customers.

Q. What are the Company's goals for the EVIP?

A. There are two primary goals for the program: increase electric vehicle ("EV") adoption in the state and provide revenue to offset some of the costs and expenses of the program. Deploying infrastructure will increase EV adoption. The infrastructure must be located throughout the entire state to support intrastate travel and there must be sufficient charging infrastructure capacity to support increases in demand. Therefore, the focus will be on filling corridor gaps across the state in rural areas and increasing capacity, accessibility, and convenience in populated areas. To optimize revenue from the Company's vehicle

charging service, utilization of charging stations is paramount. To achieve high utilization, the emphasis will be on high volume EV users, which includes fleets (rideshare services, delivery vehicles, medium and heavy-duty trucks) and passenger vehicles that do not have charging access at their primary residence and rely on public charging to fuel their vehicles.

Q. How will the EVIP achieve its goals?

A. There are four core program elements that support achievement of the program goals: 1) Company-owned chargers, 2) make-ready infrastructure, 3) incentives, and 4) innovative projects and partnerships. For more information on the goals and program elements see the Exhibit RMP___(JAC-1).

Q. Briefly describe the Company-owned chargers.

A. Since most Level 2 chargers are deployed at workplaces and residences, the Company-owned chargers will be focused primarily on publicly available direct current ("DC") fast chargers. Although there could be special circumstances where Company-owned chargers include Level 2, it is expected that Level 2 chargers will be deployed through the make-ready infrastructure and incentives program elements. To ensure future-proofing, the fast chargers will be designed to charge at 150 kilowatts ("KW") and 350 KW or a similar configuration so they can charge new vehicles at the fastest charge rate possible. The chargers will utilize the Combined Charging System ("CCS") standard for charging but may include a few 50 KW CHAdeMO[1] connection ports so that legacy vehicles can have access to the chargers. The typical Company-owned charging location will have between two to six chargers comprised of a mix of 50 KW, 150 KW and 350 KW with an expected

[1] CHAdeMO is a rapid-charging DC standard, established by Toyota, Nissan, Mitsubishi and other Japanese companies in 2010. It's an abbreviation of the words Charge de Move. The idea was to create a fast-charging DC standard that would be adopted across the automotive industry, as well as other sectors relying on electrical DC charging.

capacity of around 700 KW at each location. The Company will conduct a Request for Proposals ("RFP") to select the chargers, network operator, and operations and maintenance contractor. The Company expects to deploy chargers at 20-25 locations.

Q. Briefly describe "make-ready" infrastructure.

A. "Make-ready" infrastructure programs for EV chargers are becoming more commonplace with utilities across the country. Broadly speaking, "make-ready" refers to all necessary electrical infrastructure between the utility grid interconnection and the chargers, including stepdown transformers, electric service panels, conduit, conductors (wire), switchgear and power conditioning units, mounting pads or brackets, trenching, boring, and other such elements. The EV charger itself is not part of the "make-ready" infrastructure. The Company will utilize an application process for interested customers to determine where to provide make-ready infrastructure investments, consistent with the program goals and sections 54-4-41(4) and 54-4-41(7). Non-Company EV charging operators are eligible for make-ready infrastructure investments.

Q. Please provide a brief description of the incentives.

A. The Company's Sustainable Transportation and Energy Plan ("STEP") program has provided incentives through Electric Service Schedule No. 120 - Plug-In Electric Vehicle Incentive Pilot Program ("Schedule 120"), to customers to install EV chargers since 2017. These incentives have covered a portion of the cost of the equipment and have been popular and effective. The incentives are scheduled to end on December 31, 2021, as the STEP pilot program will be completed. As part of the EVIP, the Company is proposing to provide EV infrastructure incentives to customers by continuing to offer Schedule 120 as presented in the proposed tariffs by Mr. Meredith in Exhibit RMP___(RMM-1). To date, Schedule

120 has incentivized the installation of over 70 DC fast chargers and 2,300 Level 2 chargers in the service territory, so it should be an effective mechanism to ensure EV charging access and choice for customers. The Company will utilize the same process that is currently in place for EV infrastructure incentives.[2] Non-Company EV charging operators will continue to be eligible for incentives.

Q. Briefly describe the innovative projects and partnerships.

A. As EV charging technology continues to progress, it will be imperative that the Company stays current with the latest advances in vehicle and charging technologies. In addition to monitoring changes in technology, as mentioned previously, the Company will continue to explore technology developed from the Intermodal Hub project, a STEP-funded project with Utah State University ("USU"), studying the potential for a power balance and control system at Utah Transit Authority's ("UTA") Central Station. The Company will also continue to partner with research institutions like universities and the U.S. Department of Energy and participate on innovative projects to ensure that the Company is engaged with changes in EV technology.

Additionally, the Company will participate in the Freight Logistics Electrification Demonstration ("F-LED") project,[3] a collaboration with USU, Utah Department of Transportation ("UDOT") and the Utah Inland Port Authority ("UIPA") to electrify heavy-duty freight and hauling operations within the Inland Port. The project will incorporate innovative charging systems with 5G communications including plug-in, static and dynamic wireless charging. The project will utilize advanced intelligent control systems to

[2] See https://www.rockymountainpower.net/savings-energy-choices/electric-vehicles/utah-incentives.html
[3] See Exhibit RMP_(JAC-3) for USU presentation to the Utah Legislature's Infrastructure and General Government Appropriations Subcommittee

optimize its operation and energy use. During the 2021 legislative session, the Utah Legislature appropriated funds to USU to enable the project. The Company has committed to partner with UIPA and USU on the project and provide some matching funds as part of the EVIP.

The Company also intends to partner with the Point of the Mountain Commission ("The Point"). The Company is signing a Cooperation Agreement with The Point to coordinate and collaborate on the development of EV charging infrastructure. Although The Point is a few years away from beginning its development, the Company has met with staff and provided input on the potential of transportation electrification within the development.

Further, the Company meets regularly with UDOT to coordinate plans for the deployment of EV chargers throughout the state.[4] The Company's on-going partnership with UDOT will continue to be a priority throughout the EVIP as the Company works to address the charging infrastructure needs for the state. As part of the on-going coordination, the Company and UDOT will share information on charging station locations, advancements in infrastructure technologies, changes in federal policies, and general transportation issues.

Q. Is the Company proposing new energy rates for public chargers?

A. Yes. Mr. Meredith discusses the proposed rates for public chargers under the new Schedule 60, which are summarized in Table 1 below.

[4] The Company provided informal input on the UDOT's EV Plan; see Exhibit RMP___(JAC-4).

Table 1. Proposed Schedule 60 Prices

Energy Charge	Non-RMP Customer	RMP Customer
DC Fast Charging:	$0.40 per kWh	$0.15 per kWh
Level 2 Charging:	$0.08 per kWh	$0.08 per kWh
Off-Peak Credit:	-$0.05 per kWh	-$0.05 per kWh

Session Fee
$1.00

Q. Do the proposed energy charges under Schedule 60 represent a reasonable range to recover the cost of service of direct current ("DC") fast chargers?

A. Yes. The proposed rates result in an average rate of $0.15 per kilowatt-hour ("kWh") for DC fast charging, based on the Company's assumption that 90 percent of the users will be RMP customers (10 percent non-RMP customers) and that charging events will occur off-peak 55 percent of the time and on-peak 45 percent (see Campbell workpapers for the calculation).

The Company conducted a breakeven analysis for a typical Company-owned charging location with four chargers comprised of a mix of 50 KW, 150 KW and 350 KW and an expected capacity of around 700 KW—see Confidential Exhibit RMP___(JAC-2). In the analysis, revenues at different price and utilization levels were calculated and compared against the costs and expenses of the location over a 10-year period—see Table 2.

Q. Does the Company distinguish between residential and commercial customers? Is there a potential for commercial fleets "hogging" the chargers?

A. Currently, the Company will not distinguish between residential and commercial users. Since both customer classes are contributing to the program, both will have access. In terms of the potential for "hogging," the Company notes that, as long as the customer is plugged in and receiving energy, that would indicate high utilization and be a good indicator of viability of the program. If the chargers are constantly in use, whether by commercial or residential customers, then there is high utilization, which will help to bring the program closer to its cost of service. If high utilization is interfering with access, then the Company will install additional chargers to meet the demand.

Q. Does the Company intend to discern between RMP and non-RMP customers?

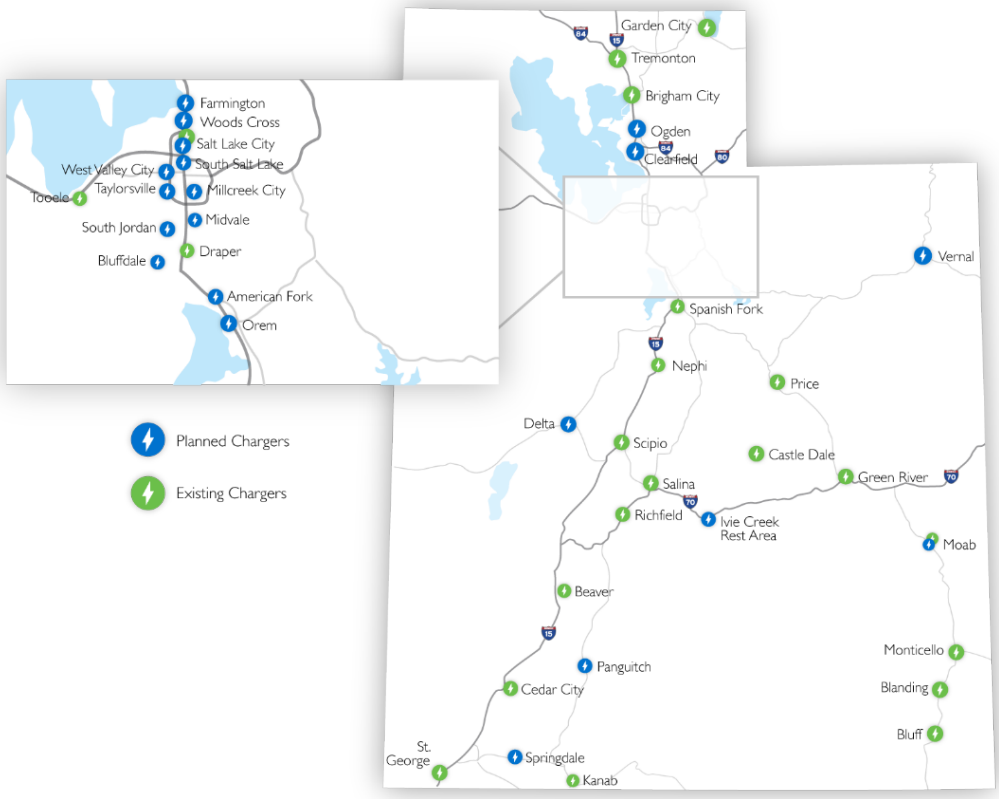
A. Yes. Consistent with section 54-4-41(2)(b)(iii) of Utah Code, the Company proposes a discount for charging service under Schedule 60 for RMP customers. For customers to realize that discount, a verification process will be created to ensure they qualify as a

customer. The Company will work with software and network vendors to create the verification process, with the expectation that it will be quick, convenient, and cost effective.

Q. Where does the Company intend to deploy Company-owned chargers?

A. The Company coordinated with key partners like UDOT and USU to identify statewide EV charging needs[5] along with potential locations for high volume EV users. The evaluation considered existing charging infrastructure[6] along with current Company system infrastructure and expected consumer needs and uses to ensure the creation of a robust state-wide network.

Figure 1. Map of Existing and Planned Charging Locations



[5] See Exhibit RMP___(JAC-4).
[6] The existing locations in Figure 1 only include sites with chargers of 100 KW or greater.

The Company locations will have between two to six chargers with a mix of 50 KW, 150 KW, and 350 KW chargers with an average capacity of 700 KW and be located within the Company's service territory. This preliminary list of sites achieves the goals of filling gaps in rural areas and serving high volume users in populated areas. This list is not exhaustive, and the final locations will be selected after detailed engineering site and marketplace evaluations are conducted. The Company expects to eventually select between 20 and 25 locations during its initial deployment of EVIP.

Q. What criteria were used in selecting the potential locations?

A. The potential sites were analyzed using eight factors, and each potential location needed to at least meet four of the eight factors. A ninth factor, which was not part of the selection criteria, was used to validate that the deployment of Company-owned chargers included some traditionally under-represented communities. For a complete description of the criteria and location evaluation see Exhibit RMP___(JAC-1), page 13.

Q. What are the expected expenditures for the EVIP?

A. The Company will make initial investments over the first five years. After the initial five-year period, the Company will re-evaluate the EVIP to ascertain the effectiveness of the overall program and the effectiveness of the initial investments in Company-owned chargers, "make-ready" infrastructure, and incentives. As part of that evaluation, the Company will assess the state of the EV market, both nationally and in Utah, advances in EV charging technologies, the performance of the installed chargers, including the network operators and their locations, the effectiveness of the "make-ready" infrastructure and incentives, and the status of the innovation efforts.[7] Based on that evaluation, the Company

[7] Innovation expenditures are captured in Company-owned, "make-ready", and incentives expenditures.

will make any necessary modifications to the EVIP including adding or removing chargers or charger locations.

The Company will conduct a thorough RFP process to select vendors to procure EV charging equipment, permit and install equipment, operate an EV network and ensure that the chargers are well-maintained and in working order. The actual cost of the EV chargers, network operations and maintenance will not be known until after the competitive bid process is completed. Further, the biggest cost variables are the installation and construction costs which will vary from site to site and will not be known until thorough engineering site assessments are conducted. The Company compiled high level estimates for spending on equipment, infrastructure, incentives, and expenses during the initial five-year period in Table 3 below:

The expenses include operation, maintenance, administrative, and general ("OMAG") expenditures, which include the Company's program management, planning, marketing and administrative costs. The Company anticipates higher OMAG at the beginning of the program as it identifies and constructs sites, hires vendors, markets the program to customers, and then lower OMAG as the program is underway. The Company also expects to hire a third party to operate the network of Company-owned chargers including the maintenance and software services. This expenditure is anticipated to be lower at the beginning of the program and will increase as more sites become operational, and repairs and part replacements are required. Lastly, the incentive amount is an estimate that anticipates customer demand based on previous experiences from the STEP program but may change from year to year. The Company may increase or decrease the amounts based on actual customer demand.

The capital spend includes three primary categories: (1) Company-owned chargers (and warranty), (2) Company-owned infrastructure (this is the infrastructure that supports Company-owned chargers), and (3) "make-ready" infrastructure (this is the infrastructure that supports customer chargers). The costs may change from year to year and are dependent on equipment prices and deliveries, construction schedules, and vendor availability. The "make-ready" infrastructure expenditures assume a 1/3 ratio to the capital spend for Company-owned chargers and infrastructure. The actual amount may change based on customer demand.

For a detailed review of the expected expenditures for the entire 10 years, see Confidential Exhibit RMP___(JAC-2).

Q. Does the Company intend to apply for additional funding from other sources?

A. Yes. The Company will look for additional resources to compliment and enhance the program, from the state and federal governments, or other opportunities.

Q. What will happen with funds if the program is not successful?

A. In the unfortunate event the program is deemed unsuccessful, the Company will cancel the program. If the program is cancelled any surplus funds remaining in the balancing account will be returned to customers after all accrued costs and expenses are covered.

Q. Is the proposed EVIP in the public interest?

A. Yes. Section 54-4-41(4) of the Utah Code identifies five specific criteria that must be met to determine the Company's program is in the public interest. The Commission must find that the charging infrastructure program:

> *a)* increases the availability of electric vehicle battery charging service in the state;
> *b)* enables the significant deployment of infrastructure that supports electric vehicle battery charging service and utility-owned vehicle charging infrastructure in a manner reasonably expected to increase electric vehicle adoption;
> *c)* includes an evaluation of investments in the Inland Port and the Point of the Mountain;
> *d)* enables competition, innovation, and customer choice in electric vehicle battery charging services, while promoting low-cost services for electric vehicle battery charging customers; and
> *e)* provides for ongoing coordination with UDOT.

The Company's plan meets criteria (a) through its proposal to initially install chargers at between 20-25 locations as part of the EVIP. These locations include sites in northern Utah in Weber, Davis, Salt Lake and Utah Counties. In addition, the Company is proposing sites in Millard County in western Utah, Sevier County in central Utah, Uintah County in eastern Utah, Washington and Garfield counties in southern Utah, and Grand County in southeast Utah. The proposed sites and installed capacity will increase the availability of charging throughout the state.

The Company expects that the EVIP will enable the significant deployment of infrastructure, consistent with criteria (b), through the Company-owned chargers, the "make-ready" investments, and customer incentives in a manner that is reasonably expected to increase EV adoption. EV adoption is highly dependent on certain variables, including gasoline price fluctuations, financial incentives, user socio-economic factors, and infrastructure availability. The significant deployment of infrastructure as the result of utility programs is an important variable that can increase EV adoption. Researchers at USU calculated a forecasted estimate[8] of EV adoption in Utah as the result of the Company's EVIP. USU evaluated three growth scenarios for EV adoption: low, medium, and high. The model illustrates that the presence of significant utility EV charging infrastructure is a critical component for EV adoption. Assuming the medium growth scenario, the predicted number of EVs in the state of Utah for years 2026 and 2031 are presented in Table 4. The numbers reflect the total number of EVs on the road in that year.

Table 4. Comparison of EV Adoption with and without RMP Programs in Utah

Year	W/out RMP Programs (# vehicles)	W/RMP Programs (# vehicles)	Increase Due to RMP Programs (# vehicles)
2026	32,000	63,000	31,000
2031	80,000	230,000	150,000

According to the USU model, EV adoption in Utah without utility programs is expected to be around 32,000 vehicles in 2026 and 80,000 vehicles in 2031. It is then expected that the

[8] See Exhibit RMP_(JAC-5)

Company's proposed EVIP would increase EV adoption in Utah by an additional 31,000 vehicles in 2026 and 150,000 vehicles by 2031.

For criteria (c), the Company is evaluating potential investments at the Utah Inland Port and Point of the Mountain developments as part of the EVIP. The Company has begun this process by working towards Cooperation Agreements with both UIPA and The Point. In the Cooperation Agreements, all parties agree to coordinate and cooperate on developing EV infrastructure within the development areas. The Company proposes to make investments within UIPA as part of the F-LED project, a state funded collaboration with UIPA and USU to electrify freight hauling operations. The Point is not far enough along in its planning process to identify specific investments, but the Company will continue to work with that agency, and it expects to be able to identify investments in the next several years.

Consistent with criteria (d), the EVIP enables competition, innovation, and customer choice for EV charging services while promoting low-cost services to customers. By expanding the availability of charging stations throughout the state as outlined in the plan, the EVIP will help provide additional access and competition for charging services. The Company is also committed to promoting low-cost services, particularly for the Company's customers that use the charging services by offering different rates to reflect the customers' contributions to the investments. To enable expanded competition and customer choice, non-Company EV charging operators are eligible for incentives and "make-ready" infrastructure investments.

To enable innovation, the Company will continue to partner and engage with leading experts in EV technology like USU, the University of Utah, U.S. Department of

Energy, UTA, the Utah Governor's Office of Energy Development, and others. The Company will also continue participating on innovative EV projects like the WestSmartEV@Scale, and F-LED. This combination of partnerships and projects will assist the Company to stay at the forefront of EV innovations and advancements.

Since the conclusion of the 2020 Utah legislative session, the Company has met criteria (e) through ongoing engagement with UDOT to coordinate on the development of a state-wide EV charging network plan.[9] During these regular informal meetings, UDOT provided input and feedback into the development of the EVIP. The meetings included discussions on state traffic patterns, rights-of-way, federal rules regarding rest stops on interstates, federal designations of Alternative Fuel Corridors, EV technology, utility service territory boundaries, and potential site locations. The Company and UDOT have agreed to continue to meet and coordinate on the planning and deployment of an EV charging network.

Q. Are the proposed investments in the EVIP prudent?

A. Yes. Section 54-4-41(7) of the Utah Code states that the Company's investments in utility-owned vehicle charging infrastructure are prudently made if the Company demonstrates that the investments can reasonably be anticipated to: (a) result in one or more projects that reduce transportation sector emissions over a reasonable time period; (b) provide the Company's customers significant benefits that may include revenue from utility vehicle charging service that offsets the Company's costs and expenses; and (c) facilitate any other measure determined by the Commission.

[9] See Exhibit RMP_(JAC-4)

Regarding (a), the proposed EVIP investments will result in multiple projects that will reduce transportation sector emissions over a reasonable time period. As discussed previously, the Company anticipates installing Company-owned chargers at 20-25 locations, in addition to facilitating multiple projects through make-ready infrastructure investments and incentives to customers. The Company predicts measurable reductions in transportation sector emissions resulting from these projects.

To calculate the projected transportation sector emission reductions from the EVIP, the Company estimated net carbon reductions using the following approach: estimate the annual carbon emissions from a representative or proxy vehicle and multiply those emissions by the total number of EVs on the road as a result of the EVIP; then subtract the associated system emissions used to serve the electrical needs of the vehicles. The investments are expected to reduce transportation sector emissions as shown in Table 5. For additional detail of this analysis see Exhibit RMP___(JAC-1), page 26.

Table 5. Annual Transportation Sector GHG Emissions Reductions

Year	Additional EVs (#)	CO2 Reduction Per Year (MT)	MWh used by EVs	CO2 System Emissions by EVs (MT)	Net CO2 Reduction Per Year (MT)	Net CO2 Reduction Per Year (lbs)
2026	31,000	143,000	107,000	46,000	97,000	213,000,000
2031	150,000	690,000	518,000	223,000	467,000	1,029,000,000

Switching an additional 31,000 and 150,000 vehicles to EVs by the years 2026 and 2031 results in an estimated annual reduction of 213 million pounds of carbon dioxide ("CO2") and 1.029 billion pounds of CO2, respectively. The Company believes the EVIP meets the

transportation sector emissions reduction requirement as outlined in section 54-4-41(7)(a) of the Utah Code.

Regarding (b), the EVIP is expected to provide customers significant benefits through revenue that offsets the expenses of the program. By investing in infrastructure and programs outlined in the EVIP, USU predicts that EV adoption will significantly increase in the state of Utah and that there will be consumer demand for company-owned public DC fast chargers. In USU's analysis,[10] revenue was estimated at a representative location of Company-owned chargers with varying levels of utilization. The representative location contains a combination of 50 KW, 150 KW, and 350 KW chargers with an average combined capacity of 700 KW. Using rates outlined in Table 1, proposed Schedule 60 prices, USU estimated revenue for a representative Company-owned charger location.

The projected annual revenue at typical Company-owned charger locations, is expected to range between $78,000 at 10 percent utilization and $309,000 at 40 percent utilization. It is anticipated that by 2027 there will be between 20-25 locations operating. The combined annual revenue at all Company locations is estimated to range between $1,560,000/year (20 locations at 10 percent utilization) and $7,725,000/year (25 locations at 40 percent utilization). These potential benefits may be conservative because the analysis only includes revenue from Company-owned public DC fast chargers. A study from McKinsey & Company predicts that public DC fast chargers will account for only 20 percent of all charging needs,[11] which means the remaining 80 percent will come from charging at home or the workplace (predominately Level 1 and Level 2 charging that, in most cases, do not

[10] Exhibit RMP_(JAC-5)
[11] Engel, et al (October 2018) *Charging Ahead: Electric Vehicle Infrastructure Demand*, McKinsey Center for Future Mobility Report

require additional system infrastructure). Charging at home and work will provide additional revenue through traditional schedules and tariffs contributing to fixed system costs and potentially benefitting all customers. Nevertheless, the Company-owned DC fast chargers should contribute significant revenue on their own. The Company believes that the proposed EVIP investments are reasonably anticipated to provide significant benefits to customers and will offset some of the costs and expenses of the program as required in section 54-4-41(7)(b) of the Utah Code.

Q. Does this conclude your direct testimony?

A. Yes.

REDACTED
Rocky Mountain Power
Exhibit RMP___(JAC-1)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

REDACTED
Exhibit Accompanying Direct Testimony of James A. Campbell

Electric Vehicle Infrastructure Program Plan

August 2021

Transportation Plan

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE PROGRAM

Date: August 16, 2021

Revision by: James Campbell

Under the 2020 Utah House Bill (HB) 396, Electric Vehicle Charging Infrastructure Amendments, now codified in section 54-4-41 of the Utah Code, the Utah Legislature authorized Rocky Mountain Power (the Company) to create an Electrical Vehicle Infrastructure Program (EVIP), with a maximum funding from customers of $50 million for all costs and expenses. The EVIP funding is for the deployment of utility-owned vehicle charging infrastructure and utility vehicle charging service provided by the Company, as defined in section 54-2-1(36) & (37) of the Utah Code.[1] The Company intends to develop and administer the EVIP over a 10-year period, starting in 2022 and operating through the end of 2031. The Company expects that after the initial 10-year period, there will be sufficient consumer demand for vehicle charging services to transition the program from its special status under HB 396 to a traditional utility program. After the initial 10-year period, the Company expects to provide vehicle charging services at the utility's cost of service and provide net benefits to customers.

In this plan, we discuss the program's goals, the elements of the program, the rate structure for the new customer class created by the program and public charging service prices, the planned investments and locations, and the expenditures and budget. This plan also describes the public interest elements of the program and provides an explanation of the prudency of the Company's proposed investments.

[1] "Utility-owned vehicle charging infrastructure" is defined as all facilities, equipment, and electrical systems owned and installed by a large-scale electric utility, either on the customer's side or the utility's side of the electricity metering equipment and are used to facility utility vehicle charging service or other electric vehicle batter charging service. *See* Utah Code Ann. § 54-4-41(36). "Utility vehicle charging service" means the furnishing of electricity to an electric vehicle battery charging station by the public utility in whose service are the charging station is located and pursuant to a duly established tariff for rates, charges, and other conditions of service. *See id*. § 54-4-41(37).

1.0 Program Goals

The Company is proposing to develop an innovative and impactful infrastructure program that will have two primary goals: first, increase electrical vehicle (EV) adoption in the state of Utah, and second, operate an efficient and low-cost infrastructure program that adds revenue to the system

1.1 Increase EV Adoption

The EVIP will prioritize the deployment of EV chargers to create a robust EV charging network throughout the entire state. The EVIP will also work to ensure that there is sufficient EV charging capacity in high population areas. To assist in determining that the deployment is consistent with the needs for the state, the Company has worked with and will continue work with partners, including the Utah Department of Transportation (UDOT), the Utah Department of Environmental Quality, and the Governor's Office of Energy Development, to identify the optimum locations for investment in charging stations so that EV adoption is increased.

Studies have shown that two of the biggest barriers to EV adoption are low battery range (the distance a vehicle can travel on a single charge) and insufficient charging infrastructure. The combination of limited battery range and lack of charging infrastructure creates what is known as range anxiety. Range anxiety is the fear that a vehicle has insufficient range to reach its destination and would thus strand the vehicle's occupants. A study from Cox Automotive[2] found that the vehicle's battery range is becoming less of a concern as newer vehicles have battery ranges of over 200 miles but that the "priority is infrastructure" and that "there is a clear need for more charging stations". This is consistent with a poll conducted by Volvo/Harris as part of Volvo Reports[3] on

[2] Petusky, R (August 2019) *Evolution of Mobility: The Path to Electric Vehicle Adoption*, Cox Automotive Study
[3] Volvo Car USA and The Harris Poll, *The State of Electric Vehicles in America,* Volvo Reports No 7, February 2019

the "State of Electric Vehicles in America" which set out to explore drivers' perceptions of electric vehicles. The Volvo/Harris poll found that "the number one factor that would increase most drivers' likelihood to purchase an EV was more charging stations". By deploying utility-owned charging infrastructure and creating a robust charging network, the EVIP can be expected to increase electrical vehicle adoption.

1.2 Operate an Efficient and Low-Cost Program that Results in Additional Revenue

To ensure that low-cost services are available for customers, an objective is to operate the program efficiently while reducing operating costs as much as possible. The Company will look to the marketplace to find an EV network provider to assist in managing the operation and maintenance of the EV charger network so that the Company can provide services to customers that are reliable, efficient, and low cost. To find that network operator, the Company will conduct a competitive request for proposal (RFP). Further, the Company is committed to providing customers with low-cost EV charging services to reflect customers' contributions to infrastructure investments.

Although it is expected that some of the EV infrastructure investments will be "loss leaders" and will not generate significant revenue, particularly in remote areas, the EV infrastructure investments are still needed to ensure a robust network throughout the state. Despite certain charging stations being unlikely to generate significant revenue, a program objective is to deploy other infrastructure that is expected to generate revenue so that a portion of the overall program costs and expenses can be recouped. By focusing some of the investments on infrastructure that will cater to high volume users (vehicles that purchase large amounts of electricity from public charging stations), it is anticipated that additional revenue will be collected. High volume users are expected to come from fleets (including medium and heavy-duty vehicles) and passenger vehicles that do not have charging access at the primary residence and rely on public charging to

fuel their vehicles. Therefore, the Company will place charging infrastructure at locations that optimize usage for high volume vehicles, along with locations that support a state-wide network.

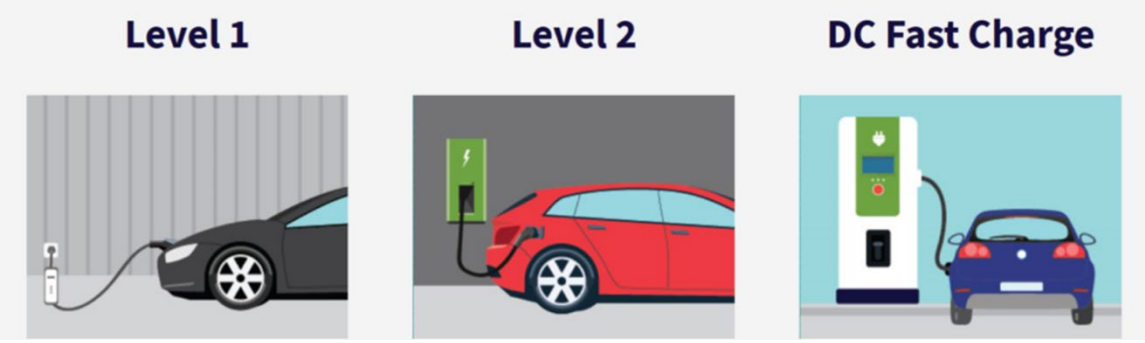
2.0 EVIP Program Elements

There are four core program elements which will be the mechanism by which the EVIP achieves the program goals outlined in Section 1.1. The four core program elements are: 1) Company-owned chargers, 2) make-ready infrastructure, 3) incentives, and 4) innovative projects and partnerships.

2.1 Company-owned chargers

A primary element of the EVIP is the investment and deployment of Company-owned chargers. Charging equipment for EVs is classified by the rate at which the batteries are charged. Charging times vary based on how depleted the battery is, how much energy it holds, the type of battery, and the type of charging equipment (e.g., charging level and power output). The charging time can range from five minutes to 20 hours or more, depending on these factors. There are three different levels of charging equipment, see Figure 1. Level 1 equipment provides charging through a 120 volt alternating current (AC) plug. Most, if not all, EVs will come with a Level 1 cordset, so no additional charging equipment is required. AC Level 2 equipment offers charging through 240 V (typical in residential applications) or 208 V (typical in commercial applications) electrical service. Both Level 1 and 2 charging equipment uses the Society of Automotive Engineers (SAE) J1772 connector. Direct-current (DC) fast charging equipment typically uses 208/480 V AC three-phase input that enables rapid charging. There are three types of DC fast charging systems, depending on the type of charge port on the vehicle: SAE Combined Charging System (CCS), CHAdeMO, and Tesla.

Figure 1. Description of Charging Levels[4]



Level 1	Level 2	DC Fast Charge
VOLTAGE; 120V 1-Phase AC	**VOLTAGE;** 208V or 240 V 1-Phase AC	**VOLTAGE;** 208V or 480V 3-Phase AC
AMPS: 12-16 Amps	**AMPS:** 12-80 Amps	**AMPS:** >100 Amps
CHARGING LOAD: 1.4-1.9 kW	**CHARGING LOAD:** 2.5-19.2 kW (Typ. 6.6 kW)	**CHARGING LOAD:** 50-350 kW
CHARGING TIME: 3-5 Miles per Hour	**CHARGING TIME:** 12-60 Miles per Hour	**CHARGING TIME:** 100 Miles in 40 min (50 kW) 100 Miles in 12 min (150 kW) 100 Miles in 5 min (350 kW)

The Company-owned chargers will be comprised primarily of DC fast chargers but may include Level 2 chargers for specific circumstances. Since most Level 2 chargers are deployed at workplaces and residences, the Company-owned chargers will be focused primarily on publicly available DC fast chargers. Although there could be special circumstances where Company-owned chargers include Level 2, it is expected that Level 2 chargers will be deployed as part of the EVIP through make-ready infrastructure and incentives. To ensure future proofing, the DC fast chargers will be designed to charge at 150 KW and 350 KW or a similar configuration so they can charge new vehicles at the fastest charge rate possible. The chargers will utilize the Combined Charging System (CCS) standard for charging but may include a few 50 KW CHAdeMO connection ports so that legacy vehicles can have access to the chargers. The typical Company-owned charging location will have between two to six chargers comprised of a mix of 50 KW, 150 KW and 350 KW with an expected capacity of around 700 KW at each location. The Company

[4] Source: https://www.advancedenergy.org/2020/11/01/an-overview-of-electric-vehicles-and-charging-stations/

will conduct a thorough RFP to select the chargers, network operator, and operations and maintenance contractor. The Company expects to deploy chargers at 20-25 locations. The goals in deploying the chargers are to create both a state-wide network and to establish locations that serve high-volume users.

2.2 Make-Ready Infrastructure

"Make-ready" infrastructure programs for EV chargers are becoming more commonplace with utilities across the country. Broadly speaking, "make-ready" refers to all necessary electrical infrastructure between the utility grid interconnection and the chargers, including stepdown transformers, electric service panels, conduit, conductors (wire), switchgear and power conditioning units, mounting pads or brackets, trenching, boring, and other such elements. The EV charger is not part of the "make-ready" infrastructure. The Company will include "make-ready" infrastructure as part of the EVIP and may in some circumstances include investments on the customer side of the meter as allowed under sections 54-2-1(36) and 54-4-41 of the Utah Code.

The Company will utilize an application process for interested customers to determine where to provide "make-ready" infrastructure investments. Applications will be evaluated and prioritized based on satisfaction of program goals discussed in Section 1.1, and which are determined to be in the public interest as outlined in section 54-4-41(4) of the Utah Code, and which are prudent investments as outlined in section 54-4-41(7) of the Utah Code. Non-Company EV charging operators are eligible for make-ready infrastructure investments.

2.3 Incentives

The Company's Sustainable Transportation and Energy Plan or STEP program has provided incentives through Schedule 120 to customers to install EV chargers since 2017. These incentives have covered a portion of the cost of the equipment and have been popular and effective. The incentives are scheduled to end on December 31, 2021, as the STEP program will be completed and closed. As part of the EVIP, the Company is proposing to provide EV infrastructure incentives to customers by continuing to offer Schedule 120. Because Schedule 120 was successful in getting charging infrastructure in the service territory, it should be an effective mechanism to ensure EV charging access and choice for customers. The Company will utilize the same process that is currently in place for EV infrastructure incentives[5]. Non-Company EV charging operators will continue to be eligible for incentives.

2.4 Innovative Projects and Partnerships

As EV charging technology continues to progress, it will be imperative that the Company stays current with the latest advances in vehicle and charging technologies. Some of the areas that the program will monitor include: mega-watt high-powered charging, static and dynamic inductive wireless charging, energy storage coupled with charging, smart charging, vehicle to grid (V2G) and vehicle to infrastructure (V2I), autonomous vehicles, drone and flying vehicles.

In addition to monitoring changes in technology, as mentioned previously, the Company will continue to explore technology developed from the Intermodal Hub project, a STEP-funded project with Utah State University (USU), studying the potential for a power balance and control system at Utah Transit Authority's (UTA) Central Station. The Company will also continue to partner

[5] See https://www.rockymountainpower.net/savings-energy-choices/electric-vehicles/utah-incentives.html

with research institutions like universities and the U.S. Department of Energy and participate on innovative projects like the WestSmatEV@Scale and eMosiac projects to ensure that the Company is at the forefront of EV technology.

Additionally, the Company will participate on the Freight Logistics Electrification Demonstration (F-LED) project[6], a collaboration with USU, UDOT and the Utah Inland Port Authority (UIPA) to electrify heavy-duty freight and hauling operations within the Inland Port. The project will incorporate innovative charging systems with 5G communications including plug-in, static and dynamic wireless charging. The project will utilize advanced intelligent control systems to optimize its operation and energy use. During the 2021 legislative session, the Utah Legislature appropriated funds to USU to enable the project. The Company has committed to partner with UIPA and USU on the project and provide some matching funds as part of the EVIP.

The Company also intends to partner with the Point of the Mountain Commission (The Point). The Company has signed a Cooperation Agreement with The Point to coordinate and collaborate on the development of EV charging infrastructure. Although The Point is a few years away from beginning its development, the Company has met with staff and provided input on the potential of transportation electrification within the development.

Further, the Company meets regularly with UDOT to coordinate plans for the deployment of EV chargers throughout the state[7]. The Company's on-going partnership with UDOT will continue to be a priority throughout the EVIP as the Company works to address the charging infrastructure needs for the state. As part of the on-going coordination, the Company and UDOT will share

[6] See Exhibit RMP_(JAC-3) for USU presentation to the Utah Legislature's Infrastructure and General Government Appropriations Subcommittee
[7] The Company provided feedback on the UDOT's EV Plan see Exhibit RMP_(JAC-4)

information on charging station locations, advancements in infrastructure technologies, changes in federal policies, and general transportation issues.

3.0 Rate Structure

Section 54-4-41(2)(b) of the Utah Code directs the Company to create a new customer class with an EV charging service rate structure that is in the public interest and has a transitional structure that will allow the Company to recover its full cost of service for charging infrastructure and charging service over a reasonable period of time. The following outlines the Company's approach to creating a new customer class, the proposed transition period for the rate structure and the proposed public charging service rate structure for Company-owned EV charging stations.

3.1 New Customer Class and Transition Rate Period

The Company proposes for the pricing to transition to cost-based pricing over a reasonable time frame. The transition will be based on the Company's annual informational cost-of-service studies, which inform how well the revenue from a customer class recovers its corresponding cost-of-service. To isolate the Company's charging stations in the studies, the Company will include them as a separate customer class beginning with the study the Company will file for 2022.

The Company proposes a 10-year time frame for the transition, with greater pricing stability in the first five years, subject to the same percentage adjustments for any base rate price change and other modifications, as warranted. After this initial period, the transition would then follow a prescribed glide-path to cost-of-service over the next five years. This glide-path would include annual pricing adjustments that move the pricing 20 percent toward cost-of-service in the sixth year, 40 percent in the seventh year, 60 percent in the eighth year, 80 percent in the ninth year, and 100 percent in the tenth year. After the tenth year, the Company plans to continue to isolate the Company's

charging stations in its annual studies and adjust the pricing as-needed to account for the stations' cost-of-service and the evolving needs of the electric vehicle industry.

3.2 Public Charging Service Rates

The Company proposes $0.40 per kWh for charging from direct current DC fast chargers by non-Rocky Mountain Power customers, $0.15 per kWh for charging from DC fast chargers by Rocky Mountain Power customers, $0.08 per kWh for level 2 charging by any user, a $0.05 per kWh credit for off-peak charging, and a $1.00 per session fee. The session fee is a charge that is assessed every time a user plugs in and transacts with the Company at one of its stations.

For DC fast charging, the Company wanted to set its price for non-Rocky Mountain Power customers at a level that was comparable to similar services offered in the marketplace. Electrify America, who has charging stations that are the most like the ones the Company plans to deploy, presently charges $0.43 per kWh. Assuming a 100 kWh charge, which would be the same as using a 150 kW charger for 40 minutes, and the $1.00 session fee, the Company calculated that a $0.40 per kWh charge would be equivalent after rounding to the nearest ten cents. The Company proposes this price would be assessed to non-Rocky Mountain Power customers.

Since the Company's Utah customers pay for EVIP as part of their monthly bills, the Company proposes that its Utah customers would receive a 75 percent discount on the proportion of the cost for DC fast charging service that is above the utility's marginal cost of service as allowed in section 54-4-41(2)(b)(iii) of the Utah Code. Using the 6.4233 cents per kWh marginal cost of service value for Schedule 6 from the Company's most recent General Rate Case[8], the Company calculated a 15 cents per kWh charge for DC fast charging by Rocky Mountain Power customers.

[8] See Schedule 6 marginal cost, excluding retail costs in Docket 20-035-04 on page 4 of Exhibit RMP___(RMM-15)

For level 2 charging, the Company calculated a rate that approximated the 6.4233 cents per kWh marginal cost of service for Schedule 6 after incorporating a time-varying element and accounting for the $1.00 session fee. First, the Company calculated an off-peak price of $0.03 per kWh based off of the average Energy Imbalance Market (EIM) prices during off-peak times in a three-year period.[9] Average EIM prices are a reasonable approximation for the cost to the Company to procure energy at different times of the day, which makes them useful for developing a time-of-use price signal. Next, the Company determined that assuming a 42 kWh charging session, which is the same as 6 hours of charging at 7 kW, an on-peak price of $0.08 per kWh would yield the average Schedule 6 marginal cost of service price. Instead of using on- and off-peak prices, the Company used an energy charge for all usage of $0.08 per kWh and an off-peak credit of -$0.05 per kWh. Since a time varying element can encourage an efficient use of the system for all charging levels, the Company proposes that the same -$0.05 per kWh off-peak energy credit would apply to DC fast charging as well. Table 1 below shows the proposed prices for Schedule 60.

Table 1. Proposed Schedule 60 Prices

Energy Charge		
	Non-RMP Customer	RMP Customer
DC Fast Charging:	$0.40 per kWh	$0.15 per kWh
Level 2 Charging:	$0.08 per kWh	$0.08 per kWh
Off-Peak Credit:	-$0.05 per kWh	-$0.05 per kWh

Session Fee
$1.00

TIME PERIODS:

On-Peak: October through May inclusive

[9] 36 months ended September 30, 2020.

8:00 a.m. to 10:00 a.m., and 3:00 p.m. to 8:00 p.m., Monday through Friday, except holidays.

June through September inclusive

3:00 p.m. to 8:00 p.m., Monday through Friday, except holidays.

Off-Peak: All other times.

The Company believes the proposed session fees and energy charges in Table 1 reflect current market rates for public charging service in Utah, while at the same time sending price signals that encourage individuals to use the charging stations in a way that represent the Company's cost to provide this service.

4.0 Planned Investments

The Company will make investments in Company-owned chargers, make-ready infrastructure, and incentives as part of the EVIP. The Company will determine the locations for Company-owned chargers based on whether the investments are expected to achieve the program goals outlined in Section 1.1. Specifically, the Company will focus the charging station deployment at locations that contribute to completing gaps throughout the state and locations that support increased access and capacity for high-volume users, such as fleets and vehicles without charging at their residence, which can provide revenue to offset program costs. The selection of "make-ready" infrastructure and incentive investments will be made to interested customers and non-customers whose projects meet the public interest requirements in section 54-4-41(4) of the Utah Code and that are prudent investments as required in section 54-4-41(7) of the Utah Code. The investments in innovative projects and partnerships will be captured through the Company-owned chargers, make-ready infrastructure and incentives. For example, contributions to the F-LED project at the Inland Port will be captured through the "make-ready" infrastructure investments.

4.1 Approach

The Company intends to develop and administer the EVIP over a 10-year period starting in 2022 and operating through 2031. The Company will make initial investments over the first five years. After the initial five-year period, the Company will re-evaluate the EVIP to ascertain the effectiveness of the overall program and the effectiveness of the initial investments in Company-owned chargers, "make-ready" infrastructure, and incentives. As part of that evaluation, the Company will assess the state of the EV market both nationally and in Utah, advances in EV charging technologies, the performance of the installed chargers, including the network operators and their locations, the effectiveness of the "make-ready" infrastructure and incentives, and the status of the innovation efforts. Based on that evaluation, the Company will make any necessary modifications to the EVIP, including adding or removing chargers or charger locations.

4.2 Potential Locations for Company-Owned Chargers

The Company coordinated with key partners like UDOT and USU to identify statewide EV charging needs,[10] along with potential locations for high volume EV users. The evaluation considered existing charging infrastructure, as well as current Company-owned electrical infrastructure and expected consumer needs and uses to ensure the creation of a robust state-wide network. To select locations, the Company utilized eight primary criteria to determine if the proposed communities were appropriate for the deployment of EV infrastructure. The Company also used a ninth factor to review the proposed locations to check that the selected locations included under-represented communities. The criteria factors used were:

1) High-powered charging infrastructure is not present-Although there are many 50 KW chargers that are publicly available, to properly serve the next generation of electric vehicles charging speeds need to be a minimum of 100KW or greater. In the initial selection of locations,

[10] See Exhibit RMP_(JAC-4)

this criterion prioritized communities without access to 100KW or greater DC fast chargers. The presence of high-powered charging was checked using the Plugshare website[11].

2) Interstate highway is within 2 miles-Access and proximity to Interstates will increase the potential use of the chargers; this is particularly true for fleets and long-distance travelers. It also increases convenience for consumers. Google maps[12] was checked to measure the communities' distance from Interstates.

3) Mass transit center is in the community-There is a natural synergy between mass transit and electric vehicles. There is the potential for shared infrastructure between electric light rail, electric buses and public DC fast chargers as envisioned in the Intermodal Hub STEP project. Further, there is the potential to leverage park and ride facilities. UTA's transit centers were reviewed.[13]

4) Large multi-family unit apartments have been recently constructed-Multi-family units represent a significant opportunity for public DC fast chargers since many residents will not have access to charging at home. Further, new multi-family units tend to be constructed in clusters so deploying DC fast chargers near recent construction could benefit from future builds. The CBRE Salt Lake area multi-family market outlook report was reviewed.[14]

5) Owner occupied housing is below state average-In addition to apartments, many potential EV owners live in rented housing that is comprised of single-family homes, duplexes, basements, or individual rooms. Since these potential EV owners do not control their access to charging at home, there will be a higher demand for public charging in communities with lower owner-occupied housing. This criterion compared the communities' owner-occupied housing rate with the state average. The occupancy rates in Utah were compiled by the U.S. Census.[15]

6) Gaps in corridors are filled-Assist in filling corridors or routes with needed charging infrastructure to enable drivers to travel throughout the entire state. Coordinated with UDOT to identify gaps.

7) Destination or special use areas-Prioritized communities that are either a destination or a key pathway for a destination and special use areas. Destinations include national parks, national monuments, state parks, or recreation areas. Further, this criterion includes special use areas, which are areas that attract many people to a single location or area. Special use areas include universities and colleges, military installations, or development districts (e.g., UIPA and The Point).

8) Rural Area-Priority is given to rural areas to ensure the entire state has access to charging infrastructure. According to the U.S. Census,[16] rural areas are defined as areas that are not urban. There are two urban classifications: "Urbanized Areas" have a population of 50,000 or more, and "Urban Clusters" have a population of at least 2,500 and less than 50,000. Utah has five metropolitan areas (Logan, Ogden, Salt Lake, Provo, and St. George) that meet the "Urbanized Areas" definition. For this analysis rural areas are outside of the five "Urbanized Areas" of the state.

9) Traditionally Under-Represented Community-This factor compares the non-white population of the community with the average non-white population of the state[17]. If the

[11] www.plugshare.com
[12] www.google.com/maps
[13] https://www.rideuta.com/Rider-Tools/Schedules-and-Maps
[14] https://www.cbre.us/research-and-reports/Salt-Lake-City-Multifamily-2020-Review-2021-Outlook
[15] https://www.census.gov/quickfacts/UT (Based on July 2019 Data)
[16] https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural.html
[17] https://www.census.gov/quickfacts/UT (Based on July 2019 Data)

community had a greater amount of non-white population, then it was included as traditionally under-represented community. This factor is not determinative, and it was not included in selecting communities, rather it was used as a check to validate that traditionally underserved communities are included in the deployment of chargers.

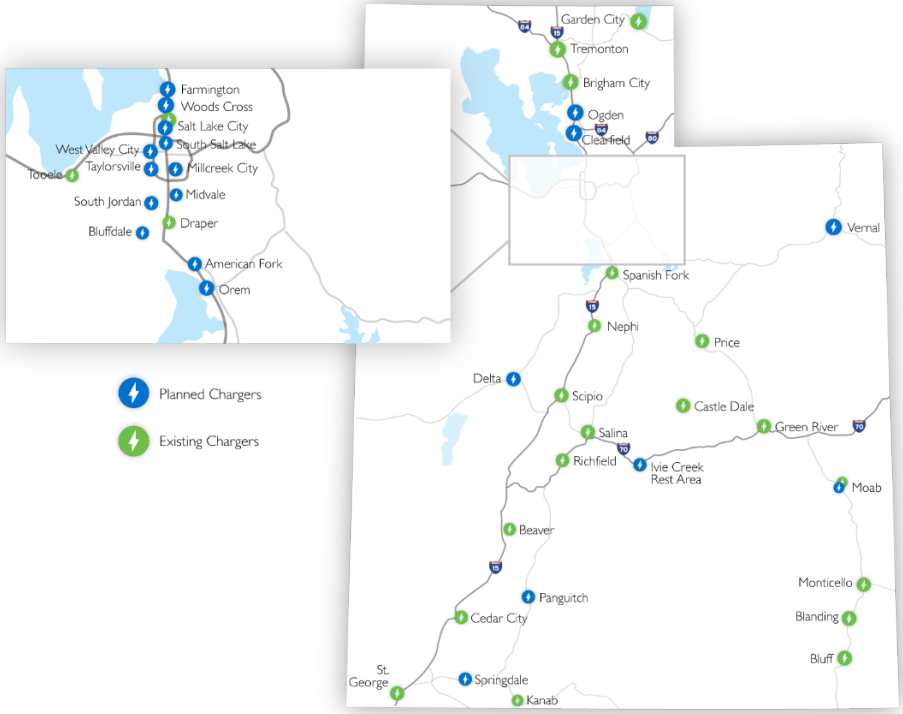
Table 2. Location Selection Criteria

Cities	Does Not Have Existing High Powered Chargers	Less than 2 mi from an Interstate	Host to Mass Transit Center	Multiple New Large Apartments	Owner Occupied Housing Below State Avg	Fills Corridor Gaps	Destination, or special use	Rural	Traditionally Under-respresented Community
Ogden	x	x	x	x	x		x		x
Clearfield	x	x	x	x	x		x		x
Farmington	x	x	x	x					
Woods Cross	x	x	x	x					
Salt Lake City		x	x	x	x		x		x
South Salt Lake	x	x	x	x	x				x
West Valley City	x	x	x	x	x				x
Millcreek City	x	x		x	x				
Taylorsville	x	x			x		x		x
Midvale	x	x	x	x	x				x
South Jordan	x	x	x	x					
Bluffdale	x	x		x			x		
Vernal	x				x	x	x	x	
American Fork	x	x	x	x					
Orem	x	x	x	x	x		x		x
Delta	x					x	x	x	
Ivie Creek I-70	x	x				x	x	x	
Moab					x	x	x	x	x
Panguitch	x					x	x	x	
Springdale	x		x				x	x	

The potential sites were analyzed using eight criteria factors, and each potential location needed to at least meet four of the eight factors to be selected, see Table 2. A ninth factor, which was not part of the selection criteria, was used to validate that the deployment of Company-owned chargers included traditionally under-represented communities. The Company identified 20 communities as potential sites for its initial deployment of Company-owned chargers, see the map in Figure 2.

The map contains existing charging sites and planned locations. The existing sites[18] include locations throughout the entire state and only with chargers of over 100KW.

Figure 2. Map of Existing and Planned Charging Locations



The Company locations will have between two and six chargers with a mix of 50 KW, 150 KW, and 350 KW chargers with an average total installed capacity of 700 KW and be located within the service territory. This list is not exhaustive, and the final locations will be selected after detailed engineering site and marketplace evaluations are conducted. The Company expects to

[18] The existing sites may include multiple operators, but the Tremonton, Tooele, Draper, and Nephi the sites are Tesla Superchargers only. Although Tesla chargers are currently limited to Tesla vehicles, Tesla has recently announced their intention to allow other vehicles to use their chargers.

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eventually select between 20-25 locations during its initial deployment of EV chargers as part of the EVIP.

4.3 Expenditures

The Company will conduct a thorough RFP process to select vendors to procure EV charging equipment, permit and install equipment, operate an EV network and ensure that the chargers are well-maintained and in working order. The actual cost of the EV chargers, network operations and maintenance will not be known until after a competitive bid process is completed. Further, the biggest cost variables are the installation and construction costs which will vary from site to site and will not be known until thorough engineering site assessments are conducted. The Company compiled high level estimates for spending on equipment, infrastructure, incentives, and expenses during the initial five-year period, see Table 3.

The expenses include operation, maintenance, administrative, and general (OMAG) expenditures which includes the Company's program management, planning, marketing and administrative costs. The Company anticipates higher OMAG at the beginning of the program as it identifies and constructs sites, hires vendors, markets the program to customers and then lower OMAG as the program is underway. The Company also expects to hire a third party to operate the network of Company-owned chargers including the maintenance and software services. This expenditure will be lower at the beginning of the program but then increase as more sites become operational, and repairs and part replacements are required. The final operational expense listed in Table 3 is for Incentives. The Incentive amount is an estimate anticipating customer demand based on previous experiences from the STEP program but may change from year to year. The Company may increase or decrease the amounts based on actual customer demand.

The capital spend includes three primary categories (1) Company-owned chargers (and warranty), (2) Company-owned infrastructure (this is the infrastructure that supports Company-owned chargers), and (3) "make-ready" infrastructure (this is the infrastructure that supports customer chargers). The costs may change from year to year and are dependent on equipment prices and deliveries, construction schedules, and vendor availability. The "make-ready" infrastructure expenditures assume a 1/3 ratio to the capital spend for Company-owned chargers and infrastructure. The actual amount may change based on customer demand.

4.4 Revenue from Company-owned Chargers

The Company-owned chargers are expected to provide revenue to help offset some of the costs of the program. Section 3.2 outlines the proposed prices for the DC fast chargers, for which there are two different rates: one for RMP customers ($0.15 kWh) and another for non-RMP customers ($0.40 kWh), with an off-peak discount of $0.05 kWh for both types of users. The Company estimates that 90% of the users will be RMP customers and 10% non-RMP customers and that charging sessions will occur off-peak 55% of the time and on-peak 45%. The average kWh price collected during charging sessions using these ratios is $0.15 kWh, see Campbell workpapers for the calculation.

In USU's analysis on EV Adoption and Charger Utilization, see Exhibit RMP_(JAC-5), revenue was estimated at a representative location of Company-owned chargers with varying levels of utilization. The representative location contains a combination of 50 KW, 150KW, 350 KW chargers with an average combined capacity of 700KW.

4.5 Cost Recovery

The Company anticipates spending up to $50 million for all investments, costs, and expenses for the program over the 10-year period. The Company proposes to recover $5 million per year for 10 years from customers for these expenditures. The Company is proposing collecting the same amount per year so the EVIP has a predictable impact on customers' bills and there are no fluctuations in the billing rate over the life of the program.

4.6 Risks

It should be noted that there are risks in achieving the timelines and estimated expenditures. Among the risks are potential supply chain issues resulting from COVID disruptions, tariffs, inflation, and semiconductor shortages. Another risk is potential demand for chargers, particularly if the Federal government rolls out an aggressive EV infrastructure program which could put pressure on current EV charger equipment supply and prices. Lastly, there could be a shortage of construction crews, as there is strong demand for construction workers in the state of Utah.

5.0 Public Interest

In HB 396, the Utah Legislature identified criteria for the Commission to determine if the Company's charging infrastructure program is in the public interest. Section 54-4-41(4) of the Utah Code identifies five specific criteria that must be met for the Commission to determine the Company's program is in the public interest. The Commission must find that the charging infrastructure program: a) increases the availability of electric vehicle battery charging service in the state; b) enables significant deployment of infrastructure that supports electric vehicle battery charging service and utility-owned vehicle charging infrastructure in a manner reasonably expected to increase electric vehicle adoption; c) includes an evaluation of investments in the Inland Port and the Point of the Mountain state lands; d) enables competition, innovation, and customer choice in electric vehicle battery charging services, while promoting low-cost services for electric vehicle battery charging customers; and e) provides for ongoing coordination with UDOT. The proposed EVIP is in the public interest and meets the criteria established by the Utah Legislature.

5.1 Increases Availability of Charging Throughout the State

The Company proposes to initially install chargers at between 20-25 locations as part of the EVIP. These locations include sites in northern Utah in Weber, Davis, Salt Lake and Utah Counties. In addition, the Company is proposing sites in Millard County in western Utah, Sevier County in central Utah, Uintah County in eastern Utah, Washington and Garfield counties in southern Utah, and Grand County in southeastern Utah. The proposed sites and average installed capacity will increase the availability of charging throughout the state.

5.2 Enables Significant Deployment of Infrastructure Expected to Increase EV Adoption

The Company expects that the EVIP will enable the significant deployment of infrastructure through the Company-owned chargers, the "make-ready" investments, and customer incentives in a manner that is reasonably expected to increase EV adoption. EV adoption is highly dependent on certain variables, including gasoline price fluctuations, financial incentives, user socio-economic factors, and infrastructure availability. The significant deployment of infrastructure as the result of utility programs is an important variable that can increase EV adoption. Researchers at USU calculated a forecasted estimate[19] of EV adoption in Utah as the result of the Company's EVIP. The forecast includes light and heavy-duty vehicles, (LDV and HDV) in Utah. The forecast used a Bass model defined as:

$$F(t) = M\frac{1 - e^{-(p+q)t}}{1 + (q/p)e^{-(p+q)t}}$$

Where:

$F(t)$: cumulative adoption by time t

[19] See Exhibit RMP_(JAC-5)

M: market potential, need to be estimated in advance

p: coefficient of innovation

q: coefficient of imitation

The coefficients p and q were calibrated by the historical EV adoption data collected from the Alliance of Automobile Manufacturers (AAM) and Utah Department of Motor Vehicles for passenger vehicles, and similar adoption patterns were assumed for light-duty trucks and Sport Utility Vehicles. USU originally developed the model as part of the WestSmartEV project and updated the model in 2020 for the EVIP analysis. USU researchers calculated the adoption model with the utility programs and without the utility programs, see Figure 3. USU evaluated three growth scenarios for EV adoption, low, medium, and high. The model illustrates that the presence of significant EV charging infrastructure is a critical component for EV adoption.

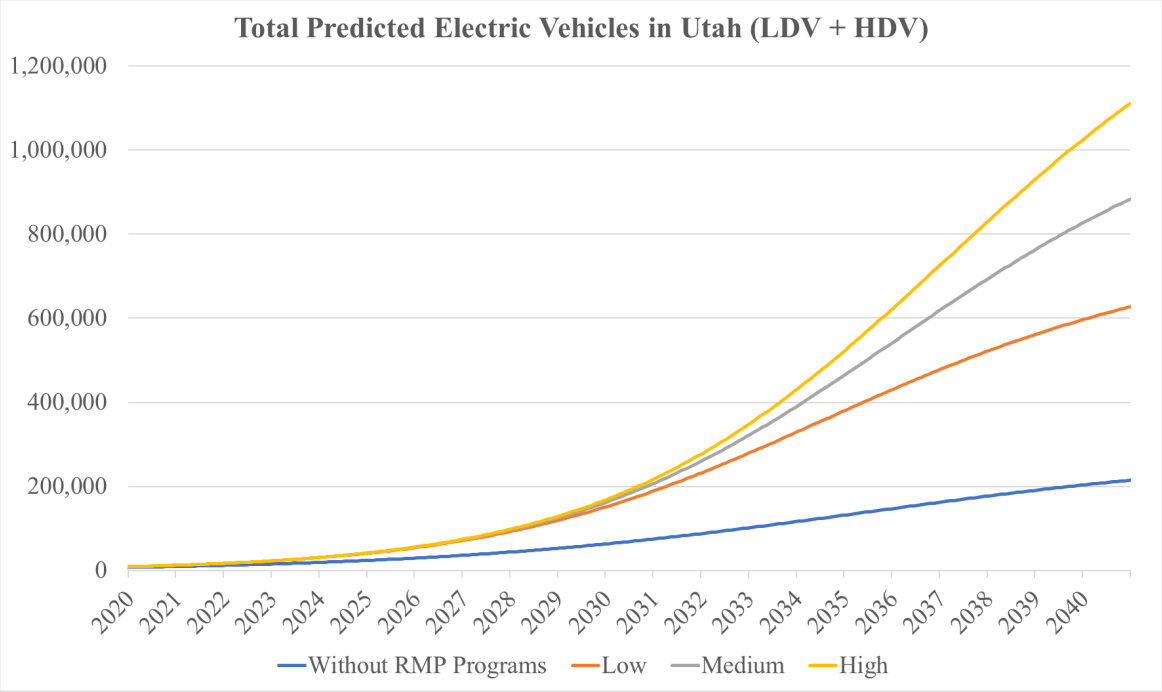


Figure 3. Predicted EV Adoption in Utah from Utility Programs

Assuming the medium growth scenario, the predicted number of EVs in the state of Utah for years 2026 and 2031 are presented in Table 5. The numbers reflect the total number of EVs on the road in that year.

Table 5. Comparison of EV Adoption with and without RMP Programs in Utah

Year	W/out RMP Programs (# vehicles)	W/RMP Programs (# vehicles)	Increase Due to RMP Programs (# vehicles)
2026	32,000	63,000	31,000
2031	80,000	230,000	150,000

According to the USU model, EV adoption in Utah without utility programs is expected to be around 32,000 vehicles in 2026 and 80,000 vehicles in 2031. It is then expected that the Company's proposed EVIP would increase EV adoption in Utah by an additional 31,000 vehicles in 2026 and 150,000 vehicles by 2031.

5.3 Evaluation of Inland Port and Point of the Mountain Developments

The Company is evaluating potential investments at the Utah Inland Port and Point of the Mountain developments as part of the EVIP. The Company has begun this process by signing Cooperation Agreements with both UIPA and The Point. In the Cooperation Agreements, all parties agree to coordinate and cooperate on developing EV infrastructure within the development areas. The Company proposes to make investments within UIPA as part of the F-LED project, a state funded collaboration with UIPA and USU, to electrify freight hauling operations. The Point is not far enough along in their planning process to identify specific investments, but the Company will continue to work with that agency, and it expects to be able to identify investments in the next couple of years.

5.4 Enables Competition, Innovation, Customer Choice, and Low-Cost Services

The EVIP enables competition, innovation, and customer choice for EV charging services while promoting low-cost services to customers. By expanding the availability of charging stations throughout the state as outlined in the plan, the Company will help provide additional access and competition for charging services. The Company is also committed to promoting low-cost services, particularly for Company customers that use the charging services, by offering different rates to reflect the customers' contributions to the investments. To enable expanded competition and customer choice, non-Company EV charging operators are eligible for incentives and "make-ready" infrastructure investments. The Company expects that these additional investments will enable other EV charging providers to enter the market, which will lead to increased customer choice and competition.

To enable innovation, the Company will continue to partner and engage with leading experts in EV technology like USU, the University of Utah, U.S. Department of Energy, UTA, the Utah Governor's Office of Energy Development, and others. The Company will also continue participating on innovative EV projects like the WestSmartEV@Scale, and F-LED. This combination of partnerships and projects will assist the Company to stay at the forefront of EV innovations and advancements.

5.5 Ongoing Coordination with UDOT

Since the conclusion of the 2020 Utah legislative session, the Company has met continuously with UDOT to coordinate on the development of a state-wide EV charging network plan[20]. During these regular informal meetings, UDOT provided input and feedback into the development of the

[20] See Exhibit RMP_(JAC-4)

EVIP. The meetings included discussions on state traffic patterns, rights-of-way, federal rules regarding rest stops on interstates, federal designations of Alternative Fuel Corridors, EV technology, utility service territory boundaries, and potential site locations. The Company and UDOT have agreed to continue to meet and coordinate on the planning and deployment of an EV charging network.

6.0 Prudent Investments

Section 54-4-41(7) of the Utah Code states that the Company's investments in utility-owned vehicle charging infrastructure are prudently made if the Company demonstrates that the investments can reasonably be anticipated to: a) result in one or more projects that reduce transportation sector emissions over a reasonable time period; b) provide the Company's customers significant benefits that may include revenue from utility vehicle charging service that offsets the Company's costs and expenses; and c) facilitate any other measure determined by the Commission.

The Company believes that the proposed EVIP investments in Company-owned chargers, make-ready infrastructure, and incentives are prudent and are reasonably anticipated to meet the requirements outlined by the Legislature.

6.1 Reduction in Transportation Sector Emissions

The proposed EVIP investments will result in multiple projects that will reduce transportation sector emissions over a reasonable time period. As discussed previously, the Company anticipates installing Company-owned chargers at 20-25 locations, in addition to facilitating multiple projects through make-ready infrastructure investments and incentives to customers. The Company predicts measurable reductions in transportation sector emissions resulting from these projects.

To calculate the projected transportation sector emission reductions from the EVIP, the Company estimated net carbon reductions using the following approach: estimate the annual carbon emissions from a representative or proxy vehicle and multiply those emissions by the total number of EVs on the road as a result of the EVIP; then subtract the associated system emissions used to serve the electrical needs of the vehicles:

$$Total\ CO2\ Emission\ Reductions = Proxy\ vehicle\ annual\ CO2\ emissions \times \#\ of\ vehicles - System\ Emissions\ from\ EVs$$

The proxy vehicle selected is a typical light duty passenger vehicle.

According to the United States Environmental Protection Agency (EPA)[21],

> "a typical passenger vehicle emits about 4.6 metric tons (MT) of carbon dioxide per year. This number can vary based on a vehicle's fuel, fuel economy, and the number of miles driven per year. The average gasoline vehicle on the road today has a fuel economy of about 22.0 miles per gallon and drives around 11,500 miles per year. Every gallon of gasoline burned creates about 8,887 grams of CO_2, and there are one million grams per metric ton."

Using the EPA estimate for light duty passenger vehicles is conservative because it does not include light duty trucks, delivery vans, or medium and heavy-duty trucks which all have greater emissions per mile driven and typically have more vehicle miles travelled per year, thus the risk of overestimating the emissions benefits from the EVIP is small.

To determine the number of EVs on the road as a result of the EVIP, the Company used the USU analysis (see Section 5.2) on EV adoption. According to the USU projection, EV adoption in Utah is estimated to increase by 31.000 vehicles in 2026 and 152,000 vehicles in 2031 due to the implementation of the EVIP.

[21] U.S. EPA Office of Transportation and Air Quality, *Greenhouse Gas Emission from Typical Passenger Vehicle*, EPA-420-F-18-008, March 2018

The system emissions associated with providing electricity to EVs are calculated and subtracted from forecasted emission reductions. To calculate the associated system emissions, the Company's system emissions factor is estimated for 2026 and 2031, using 2019 Integrated Resource Plan (IRP), see Exhibit RMP_(JAC-6) for a description of the factor calculation. The electricity consumed by the vehicles is estimated by multiplying an average kWh per mile by total miles driven in a year. The kWh per mile can vary from vehicle to vehicle and driver to driver depending on driving conditions (mountains/temperature) and habits (fast versus efficient). According to JD Power,[22] the 2021 Tesla Model 3 gets 0.24 kWh per mile and Ford Mustang Mach E gets 0.34 kWh per mile. The Company used an average value of 0.3 kWh per mile. Further, the Company used EPA's estimate that a typical passenger car drives 11,500 miles per year.

The EVIP is expected to reduce transportation sector emissions as shown in Table 6.

Table 6. Annual Transportation Sector GHG Emissions Reductions

Year	Additional EVs (#)	CO2 Reduction Per Year (MT)	MWh used by EVs	CO2 System Emissions by EVs (MT)	Net CO2 Reduction Per Year (MT)	Net CO2 Reduction Per Year (lbs)
2026	31,000	143,000	107,000	46,000	97,000	213,000,000
2031	150,000	690,000	518,000	223,000	467,000	1,029,000,000

Switching an additional 31,000 and 150,000 vehicles to EVs by the years 2026 and 2031 results in estimated annual reductions of 213 million pounds of carbon dioxide and 1.029 billion pounds of carbon dioxide (CO2), respectively. The Company believes the EVIP meets the transportation sector emissions reduction requirement as outlined in section 54-4-41(7)(a) of the Utah Code.

[22] https://www.jdpower.com/cars/shopping-guides/what-is-kwh-per-100-miles

6.2 Significant Benefits

The EVIP is expected to provide customers significant benefits through revenue that offsets the costs and expenses of the program. By investing in infrastructure and programs outlined in the EVIP, USU predicted that EV adoption will significantly increase in the state of Utah. Consumer demand for public EV chargers will come after investments are made due to the increased EV adoption that their presence enabled. A study from McKinsey & Company[23] estimates that DC fast charging will supply up to 20% of the charging needs in the US by 2030. The study showed significant growth in need for public fast charging at higher adoption levels, particularly in more urbanized regions, to accommodate vehicle owners without private parking at home or work and scenarios where vehicles are operated more continuously throughout the day (e.g., fleets and ride-sharing vehicles). Therefore, if 20% of vehicles' energy is delivered to consumers via public fast charging then there should eventually be sufficient consumer demand for 20-25 Company-owned charging locations throughout the state as proposed in the EVIP.

In USU's analysis, revenue was estimated at a representative location of Company-owned chargers with varying levels of utilization. The representative location contains a combination of 50 KW, 150KW, 350 KW chargers with an average combined capacity of 700KW. Using rates outlined in Section 3.2, the estimated revenue for a representative Company-owned charger is expected to range between $78,000 at 10% utilization and $309,000 at 40% utilization. It is anticipated that by 2027 there will be between 20-25 locations operating. The combined annual revenue at all Company locations is estimated to range between $1,560,000/year (20 locations at 10% utilization) and $7,725,000/year (25 locations at 40% utilization). These potential benefits may be

[23] Engel, et al (October 2018) *Charging Ahead: Electric Vehicle Infrastructure Demand*, McKinsey Center for Future Mobility Report

conservative because the analysis only includes revenue from Company-owned public DC fast chargers. As mentioned above, McKinsey & Company predicts that public DC fast chargers will account for only 20% of all charging needs, so the remaining 80% will come from charging at home or the workplace (which are predominately Level 1 and Level 2 charging and, in most cases, do not require additional system infrastructure). The charging at home and work will provide additional revenue through traditional schedules and tariffs contributing to fixed system costs and potentially benefitting all customers. Nevertheless, the Company-owned DC fast chargers should contribute significant revenue on their own. The Company believes that the proposed EVIP investments are reasonably anticipated to provide significant benefits to customers and will offset some of the costs and expenses of the program as required in section 54-4-41(7)(b) of the Utah Code.

REDACTED
Rocky Mountain Power
Exhibit RMP___(JAC-2)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

REDACTED
Exhibit Accompanying Direct Testimony of James A. Campbell

Estimated Program Expenditures

August 2021

THIS ATTACHMENT IS CONFIDENTIAL IN ITS ENTIRETY AND IS PROVIDED UNDER SEPARATE COVER

Rocky Mountain Power
Exhibit RMP___(JAC-3)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of James A. Campbell

FLED

August 2021

Freight Logistics Electrification Demonstration Project

Lays the groundwork for electrified transportation in Utah to improve air quality and stimulate economic growth

Inland Port is an ideal candidate to demonstrate capabilities for heavy duty vehicles and prepare “shovel-ready” projects for upcoming federal infrastructure funds

3-year project with Pre-Pilot Development, Infrastructure Build, and Pilot Demonstration provides validated full scale port electrification plan

Pilot infrastructure will be used long term in port electrification

Union Pacific Intermodal Facility moves 1M cargo containers per year

Demonstrate electric “hoteling” for semis to reduce overnight diesel pollution

Demonstrate site-level smart charge management to improve utilization and reduce cost

Demonstrate plug-in, static and dynamic wireless charging of heavy duty trucks and fork lifts

Leverage significant private and federal cost share

Committed commercial partners (vehicle & infrastructure)

USU-ASPIRE Pre-Pilot

Vehicle, infrastructure, and communications systems integration and evaluation in controlled environment with commercial partners

ASPIRE

Utah – Epicenter for Electrified Transportation

Phase 1

Pilot Demonstration

Comprehensive UIPA pilot in Salt Lake City, heavy duty freight logistics electrification, pre-commercial proven shovel ready solutions

Phase 2

Local Deployment

Commercialization, early manufacturing, electrify port operations, expand to local distribution

Phase 3+

Regional Deployment

Large scale manufacturing, electrify corridors, out of state expansion

Target Federal Match on Pilot Demonstration

Target Large Scale Federal Infrastructure Funding for Deployment

UTAH INLAND PORT AUTHORITY

ROCKY MOUNTAIN POWER

ASPIRE

UDOT

ASPIRE

Leverage ASPIRE Technologies from NSF and DOE R&D Funding

Leading the Nation

UTAH INLAND PORT AUTHORITY

Utah will transform and lead electrification of the logistics and supply chain network. The F-LED Project will reduce emissions and assist the Utah Inland Port Authority in reaching its mission of sustainable, equitable, and smart logistics investments.

Positioning Utah as a center of innovation and excellence creates a series of successes across the state; connecting siloed sectors of industry; igniting business opportunities; enabling innovation and creation of value-added services; leading the transition to a more sustainable logistics mobility, and; inspiring a trained digital workforce. The F-LED Project will leverage multiple technology integration programs, including 5G connectivity for vehicle, operator, and infrastructure communications.

Utah Inland Port, coupled with its advanced connected and electrified transportation technology integration, and partnered the ASPIRE Center and Rocky Mounty Power, will be a model for the future of transportation.

ASPIRE

The ASPIRE Center launched at Utah State in 2020 with $50.6M in federal funding from NSF. ASPIRE's mission is to improve health and quality of life through sustainable and equitable electrification in transportation, with specific emphasis on infrastructure to support electrifying freight and fleets.

The Utah Inland Port provides an ideal partnership and location to transition developed technologies into public systems and to position Utah as the leader for commercialization and manufacturing.

KENWORTH

Kenworth Truck Company
Research & Development
485 Houser Way North
Renton, Washington 98057
(425) 254-6046

A DIVISION OF PACCAR

February 3, 2021

Re: Utah Legislature F-LED Request for Appropriation

Dear Appropriation Committee:

On behalf of Kenworth Truck Company, this letter of commitment and support documents our intent to participate in *the Freight Logistics Electrification Demonstration Project (F-LED)*.

Kenworth is a leading manufacturer of medium- and heavy-duty trucks, with a reputation for building high quality trucks tailored for their specific task. Kenworth commits its expertise accrued over its 98-year history toward this program. For this project, Kenworth will loan an electric Class 8 heavy-duty truck to ASPIRE for the electrification pre-pilot work. Kenworth is currently working with ASPIRE on a 1 MW wireless charger project, and I personally serve on the ASPIRE Executive Advisory Board. I have found ASPIRE to be high-quality organization that executes on its deliverables, and I enjoy working with the team.

This project advances the overall goals of enabling cost-effective, high-power, static and dynamic wireless charging. The commercial viability of these technologies can help eliminate one of the barriers that heavy truck OEMs such as Kenworth face in producing zero-emission vehicles in order to reduce emissions and improve society. We strongly believe that, when adopted on a larger scale, this technology can help reduce greenhouse gas and criteria pollutant emissions.

We are committed to supporting this project by contributing our truck and our time in guiding the project to a solution that is commercially viable and desirable by our end-use customers. We are particularly enthusiastic about the State of Utah's leadership in this promising and rapidly developing technology area, and we anticipate that leadership will benefit the state both economically and environmentally.

The project partners' combined significant expertise will allow for successful project completion. Should you have any questions about our involvement, please do not hesitate to contact me at (425) 254-6046 or at brian.lindgren@paccar.com.

Sincerely,

Brian J. Lindgren
Director, Research & Development
Kenworth Truck Company

Rocky Mountain Power
Exhibit RMP___(JAC-4)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of James A. Campbell

UDOT

August 2021


UDOT
Keeping Utah Moving
Utah Statewide
EV Charging Plan

CONTENTS

For questions regarding this Plan, Committee, or Fleet Support Team please contact:

Lyle McMillan, Director, Strategic Investments
Utah Department of Transportation
801-633-6243
lmcmillan@utah.gov

Executive Summary

During Utah's 2020 legislative session, Representative Robert Spendlove and Senator David Buxton sponsored House Bill 259 (Link) directing the Utah Department of Transportation (UDOT) to develop a Statewide Electric Vehicle (EV) Charging Network Plan (Plan). The Plan's objective is twofold: to ensure access to DC Fast Charge (DCFC) electric vehicle chargers at least every 50 miles along Utah's interstate highways, and along other key highways, and to prepare for the EV charging capacity needs in Utah's urban and rural areas. This document is intended to fulfill the directives of HB 259, include contributions from stakeholder engagements, and provide guidance for EV charging station developers regarding implementation of Electric Vehicle Service Equipment (EVSE) on a statewide level.

Over the past year there has been a significant acceleration of efforts to convert the light duty surface transportation sector to alternative fuel vehicles. Most notably, the largest vehicle manufacturers (GM, VW, Ford, Volvo, Honda, etc.) have set ambitious targets for converting to a largely electrified fleet offering of light duty vehicles within 10-15 years. In some cases, manufacturers are planning a complete replacement of their internal combustion engine vehicle offerings as early as 2035 (GM, VW) and 2040 (Honda).

The aggressive efforts by the auto industry, coupled with initiatives at federal and state levels, offer the possibility of a once in a lifetime evolution of the transportation industry. The cost and range of battery electric vehicles (BEV) have improved to the point they are nearly on cost parity with internal combustion engine (ICE) vehicles. A major component to successfully incentivizing the adoption of electric vehicles is to eliminate the perception of not having enough charging infrastructure ("range anxiety") by providing an effective, efficient, and convenient charging infrastructure system.

The State of Utah and Rocky Mountain Power have installed EVSE at many state agency facilities and along key corridors. This charging infrastructure has received positive feedback by EV drivers via PlugShare.com, and available data indicate post pandemic utilization continues to increase.

The feasibility of installation and operation of DCFC infrastructure by the private sector has proven to be costly and difficult to monetize during the early phases of EV adoption. This is because of the low utilization rates, as there are relatively few EVs as a percentage of total vehicles on Utah's highways; although EV registrations in Utah are increasing 50-100% year over year since 2015. As the path to privatization of charging infrastructure continues to unfold, it appears beneficial for the public sector to invest early in the process by providing the core infrastructure necessary to support the early phases of adoption. This may be accomplished by direct EVSE installations, tax incentives, public-private

partnerships, building codes requirements and other mechanisms that encourage EVSE infrastructure build out.

Utah is a large open space state, making it essential to consider non-interstate routes that also carry a significant amount of commerce, tourism, and regional travel. Routes outside of the main interstate system often become a necessary and invaluable detour during extreme events such as crashes, floods, mud/landslides, wildfires, snowstorms, etc. We identified corridors based on their contribution to the following:

- Connectivity
- Traffic Volumes
- Tourism
- Local and Interstate Commerce
- Transportation Resilience and Public Safety
- Facilitate fleet and personal EV adoption

This plan contemplates two priorities for implementation and analysis:

1. **Priority I - EV Charging Accessibility** – filling EV charging gaps within key corridors to mitigate range anxiety and ensure charging infrastructure is located within reasonable distance from the previous and next EV chargers. This priority intends to provide a safety net for EV drivers, and may not adequately accommodate high-volume travel periods. (see 4.1)

2. **Priority II – Corridor Capacity / Urban DCFC** – adding additional EV chargers over time to accommodate increasing EV user base and EV adoption rates. We expect this next priority to be fulfilled by both private sector and strategic government investments as EV ownership increases demand for increased EVSE charging capacity. (see 4.2 & 4.3)

1.0 Introduction

In 2020, Representative Spendlove and Senator Buxton sponsored HB0259: Electric Vehicle Charging Network Plan, which was passed by the Utah Legislature. This bill directs UDOT in Utah Code (UC) 72-1-216 to develop a statewide electric vehicle charging network plan that includes the following:

- Consult with relevant entities in the private sector. The following entities were consulted in producing this Plan:
    - Rocky Mountain Power
    - Utah Association of Municipal Power Systems (UAMPS)
    - Utah Municipal Power Agency (UMPA)
    - Utah Rural Electric Cooperatives Association (URECA)
    - Former Senate President Wayne Neiderhauser
    - Utah Clean Cities (UCC)
    - Western Resource Advocates
    - Leaders for Clean Air
    - UCAIR
    - Southwest Energy Efficiency Project (SWEEP)
    - Plug In America
- Consult with other political subdivisions and other relevant state agencies, specifically the Department of Environmental Quality, the Division of Facilities and Construction Management, the Office of Energy Development, and the Department of Natural Resources. Each of these agencies were consulted in producing this Plan.
- Provide implementation strategies to ensure that EV charging stations are available at strategic locations, at incremental distances no greater than 50 miles along the state's interstate system by December 21, 2025, and along other major state highways within the state as UDOT finds appropriate.

This Statewide Electric Vehicle Charging Network Plan (Plan) fulfills the objectives of this legislation and guides its implementation.

2.0 Implementation

This Plan comprises two phases. Each phase of the Plan expands upon existing EVSE infrastructure. Cost of implementation and challenge of install increases with each phase. The goal is that by the completion of the first phase of the plan on December 31, 2025, the State EV charging network will be realized in rural communities and provide complete connectivity

(defined as *access* to EV charging infrastructure at least every 50 miles) for electrified light vehicle transportation throughout the state. Throughout the planning process, the state EV mapping platform, state park visitation data, and site-specific analyses will be evaluated to determine the most economic development strategies.

Phase 1 – EV Charging Accessibility

- This phase of the plan prioritizes filling EV charging gaps within key corridors to mitigate range anxiety and ensure charging infrastructure is located within reasonable distance from the previous and next EV chargers. The objective of this phase is to provide a safety net for EV drivers, with strategically sited capacity to accommodate high-volume travel periods. The Plan will prioritize EVSE in rural communities that would provide high benefit and are considered necessary to state-wide EV travel.

- Outlined in HB0259:
  - Strategic locations determined by the department [Utah Department of Transportation] by June 30, 2021 (this Plan)
  - Incremental distances no greater than every 50 miles along the state's interstate highway system by December 31, 2025
  - Along other major highways within the state as the department [Utah Department of Transportation] finds appropriate
  - Level 3 DC Fast Charger installations

Phase 2 – EV Charging Capacity/Densification

- Adding additional EV chargers over time to accommodate increasing EV user base and EV adoption rates. We expect this phase of the plan to be ongoing and dynamic, fulfilled by both private sector and strategic government investments as EV ownership increases demand for increased EVSE charging capacity.

3.0 Modeling Scenarios

3.1 EV Charging Accessibility Analysis (Gap)

A gap analysis examines EV charger spacing on a corridor, connectivity to cities/regions, connectivity to national and state parks, potential to continue priority corridors vital for interstate commerce, and overall contribution to the statewide network. The objective is to identify strategic locations that best connect long stretches of highway and provide EVSE access to important destinations and other EVSE corridors.

This analysis is primarily seeking to optimize connectivity and 50-mile spacing within the prioritized corridors and the network at large to ensure that connectivity goals are met and that corridors support each other in a meaningful way.

Dual DCFC chargers are recommended at key locations where three-phase 480-volt power is accessible, and Utah's commitment to implement REV-West voluntary minimum standards can be reasonably achieved. Having a minimum of two DCFC chargers at each location provides redundancy and a modicum of additional capacity to promote a positive user experience. In situations when the cost of utility upgrade to three phase power may not be economical, we recommend that alternative solutions be considered (solar and battery-based charging solutions).

3.2 EV Charging Capacity

A needs-based analysis of increasing capacity or densification of charging ports along key corridors. Increasing the number of chargers reduces wait times as more EVs use the network. Detailed models are being developed to determine the ideal number of Fast Chargers based on EV adoption rates. The Plan methodology prioritizes corridors based on AADT, tourism, economic potential, and adjacent corridor connectivity. However, improved models will look at the mix of truck (freight) and light-duty vehicles in the next year. Additionally, peak volumes, seasonal variations and other factors will also be integrated.

The Plan will seek to include data analytics from other EVSE providers to determine unique trends, issues with wait times at existing chargers and other data sets to help develop and increase capacity along heavily traveled corridors.

3.3 Corridor Capacity Prioritization Ranking

A prioritization scoring sheet is provided in the next section to help group corridors based on their traffic, connectivity, and other factors. It should not be interpreted as a definitive and chronological list to be developed, but groupings to be evaluated for the most cost effective and beneficial implementation based on available funding. Evaluation criteria include:

- Annual Average Daily Traffic (AADT) Score:
  - Score = 1: Lower AADT, Under 10000
  - Score = 2: AADT 10,001 to 20,000
  - Score = 3: AADT 20,001 and above
- Tourism Benefit:
  - Score = 1: No specific tourism destination
  - Score = 2: No specific tourism destination, but meaningfully supports connectivity
  - Score = 3: Direct connection to National Parks and high-volume tourism destinations
- Rural Economic Development:
  - Score = 1: Corridor contains locations for EVSE, but minimal economic impact.
  - Score = 2: Corridor contains locations for EVSE where EV owners may eat or shop or recreate.

    - Score = 3: Corridor contains multiple locations for EVSE where EV owners may eat and shop and recreate. These corridors also impact multiple rural communities.
- Adjoining Corridor Connectivity:
    - Score = 1: Alternative routes/transportation resilience/public safety
    - Score = 2: Key state highways that connect to high-volume destinations
    - Score = 3: Interstate Corridor

3.4 Urban EVSE Analysis

We limited urban area analysis was limited to five (5) key urban areas, and the tool may estimate needs elsewhere, and under various scenarios. Identifying specific locations in urban areas requires a more intense analysis looking at the spatial distribution of vehicle ownership, existing EVSE, government and private fleet facilities, among other potential sites.

For this planning document, we used the EVI-Pro default light-duty vehicle data from 2016 for a baseline estimate. We evaluated various rates of adoption to help show potential trend lines. It is possible that the rate of EV adoption may increase at greater speeds and the need for additional EVSE will accelerate. Future iterations of this plan will include a more comprehensive evaluation of urban EVSE strategies and potential EVSE target locations.

4.0 Analysis

The Statewide EV Charging Network Plan is to be a living document requiring frequent updates as interested parties fill gaps and install additional capacity, and to reflect ongoing stakeholder engagement, funding opportunities, and EV adoption trends. We will further refine specific EVSE location areas to fill gaps and provide connectivity to meaningful destinations and ensure effective connections to other EVSE corridors.

One of the key benefits of the Statewide EV Charging plan is to bring together interested and affected parties to help refine models by gathering valuable input. As the group coalesces around a unified plan, projects can be efficiently planned and implemented, funding sources can be leveraged, and a well-connected network will evolve. Currently, there is not enough funding to address the projected EVSE needs, and the goal of this Plan is to provide a path of steady and targeted planning to guide development and provide confidence in and comfort with advancing ongoing funding to support this transformational opportunity. A unified plan will ensure a methodical approach to developing the statewide EV network, coordinate funding and maximize the contributions of stakeholders.

4.1 GAP Analysis Results

Gap filling in non-urban areas of the EV mobility network is the initial focus priority of this Plan. There is a benefit to having EVSE in all Utah cities and towns, and this analysis attempts to bring a more practical focus to the alternative fuel corridors and regional connectivity. We will address other corridors as the identified primary corridors are completed and as funding becomes available.

When further refining gap locations it is important assess the adjoining corridors and how their EVSE locations are impacted. As an example, placing charging stations in Duchesne will help with both US-191 and US-40. Another example would be strategically placing EVSE in Morgan (I-84) to eliminate the need to backtrack on I-80 to Coalville for those traveling to or from Ogden and Evanston, Wyoming.

The table below is a summary of the Gap analysis that was performed on the GIS datasets. Multiple sites will undergo further vetting with the communities, ESPs and potential site hosts. Having multiple sites will allow for a best value contracting based on funding. For example, there may be 11 pre-screened sites and funding to accomplish 9 or 10 sites. Contractors may be able to package the 10 sites and provide better contract value.

Table 1: Gap Analysis Summary

Utah Statewide EV Charging Plan Gap Analysis Summary

EVSE Corridor Segments							Number of DCFC Sites Needed
Route	From	To	Begin Mile Post	End Mile Post	Length	(AADT) Avg Annual Daily Traffic	
I-15	Arizona Border	I-70	0	132	132	29,000	0
	I-70	US-6 (Spanish Fork)	132	258	126	20,000	0
	US-6 (Spanish Fork)	US-89 (Brigham)	258	362	104	264,000	0
	US-89 (Brigham City)	Idaho Boarder	362	400	38	180,000	0
I-215	Entire Route	Entire Route	0	28	28	100,000	0
I-70	I-15	Salina	0	57	57	8,000	1
	Salina	Green River	57	161	104	5,100	3
	Green River	Colorado Border	160	231	71	10,000	2
I-80	Nevada Border	I-15	0	119	119	8,800	4
	I-15	US-40	122	146	24	29,000	0
	US-40	Wyoming Border	146	196	50	58,000	0
I-84	Idaho Border	Tremonton (I-15)	0	41	41	10,000	0
	I-15	I-80, Echo Jct	81	119	38	15,000	0
SR-12	US-89	SR-24	0	160	160	2,000	3
SR-24	I-15	I-70	0	122	122	2,500	4
US-191	Arizona Border	I-70	0	157	157	8,700	1
	US-6	US-40	251	295	44	2,200	1
	US-40	Wyoming Border	352	404	52	1,300	1
US-40	I-80	Colorado Border	0	174	174	6,100	5
US-6	Nevada Border	I-15, Santaquin	0	111	111	1,000	3
	I-15	I-70	173	299	126	9,400	3
US-89	Arizona Border	I-70, Sevier	0	191	191	2,000	4
	I-70/Salina	US-6/Thistle	225	312	87	3,000	2
					DCFC Site Totals		37

4.2 Rural Capacity Analysis Results

The capacity analysis is a preliminary screening of corridors to provide guidance for increasing EVSE density to accommodate more users. Due to the complexities of site development for larger EVSE installations, the Statewide EV Charging Plan only provides limited initial guidance. Larger projects have the potential for more extensive site development with multiple chargers, and we expected this type of project to require significantly more detailed planning effort to develop meaningfully.

Besides increasing the allocation of existing parking area for EV parking, the Plan makes additional considerations for energy storage (or storage ready) to help mitigate potentially large electricity power demands and mitigate potentially unfeasible power line extensions to remote locations. Another consideration would integrate onsite renewable energy components to help create resilience if a power outage occurs (as happened in the recent Texas winter freeze). Finally, the heavy truck industry is nearing 300 miles range with full battery electric. Larger commercial sites may consider accommodating future EV-Semi trucks which will have even larger energy draw needs.

The Statewide EV Charging Plan team will continue to engage with stakeholders who wish to develop large-scale projects that exceed a simple retrofit of existing parking areas. Capacity is not currently an issue in Utah but will likely need to be addressed in the next two to five years.

Table 2: Capacity Analysis

Utah Statewide EV Charging Plan Priority (Capacity)							Average Annual Daily Traffic	Capacity Scoring				Route Score Totals	Capacity Priority	*Average Annual Daily Traffic (**AADT**) data does not differentiate between passangeer cars and heavy trucks. AADT varies along corridors, a blended average was used. Future detailed analysis will also consider peak hour traffic, % trucks and other relevant traffic data.* ***Urban Fast DC**: Areas that have more potential for private development.* ***COMPLETE**: Areas that have reasonably met the 50-mile spacing goals*
		Segments				Segment Length	2019	Average Annual Daily Traffic (AADT)	Tourism	Rural Economic	Corridor Connectivity			SEGMENT NOTES
	Route	From	To	Begin Mile Post	End Mile Post									
Interstate Routes	I-15	Arizona Border	I-70	0	132	132	29,000	3	3	3	2	11	1	Interstate Travel, Mighty 5, I-70, Vegas, LA
		I-70	US-6 (Spanish Fork)	132	258	126	20,000	3	3	3	3	12	1	Interstate Travel, Mighty 5, I-70, Vegas, LA, I-70,
		US-6 (Spanish Fork)	US-89 (Brigham)	258	362	104	264,000	3	3	1	1	8	2	Urban Area Development/Workplace/Home/Fleet
		US-89 (Brigham City)	Idaho Boarder	362	400	38	180,000	3	3	1	1	8	2	Urban Area Development/Workplace/Home/Fleet
	I-215	Entire Route	Entire Route	0	28	28	100,000	3	1	1	1	6	3	Urban Area Development/Workplace/Home/Fleet
	I-70	I-15	Salina	0	57	57	8,000	1	1	3	3	8	2	Rural, Connect Mighty 5
		Salina	Greenriver	57	161	104	5,100	1	2	3	3	9	1	Large Gap, Rural, Connect Mighty 5
		Greenriver	Colorado Border	160	231	71	10,000	1	3	3	3	10	1	Interstate Travel
	I-80	Nevada Border	I-15	0	119	119	8,800	1	2	1	3	7	2	Interstate Travel, Nevada Interstate
		I-15	US-40	122	146	24	29,000	3	1	1	1	6	3	Urban Area Development/Workplace/Home/Fleet
		US-40	Wyoming Border	146	196	50	58,000	3	3	1	1	8	2	Ski, tourism, interstate
	I-84	Idaho Border	Tremonton (I-15)	0	41	41	10,000	2	1	2	3	8	2	Interstate, Idaho,
		I-15	I-80, Echo Jct	81	119	38	15,000	2	2	2	3	9	1	Interstate, I-15/I-80 Connector
US Routes	US-6	Nevada Border	I-15, Santaquin	0	111	111	1,000	1	1	1	1	4	3	Connect to Nevada, Low volume.
		I-15	I-70	173	299	126	9,400	1	3	3	3	10	1	Interstate connections
	US-191	Arizona Border	I-70	0	157	157	8,700	1	3	3	2	9	1	arizona and colorado
		US-6	US-40	251	295	44	2,200	1	1	1	2	5	3	Indian Canyon, Camping.
		US-40	Wyoming Border	352	404	52	1,300	1	2	1	1	5	3	Flaming Gorge, Wyoming
	US-40	I-80	Colorado Border	0	174	174	6,100	1	2	1	1	5	3	strawberry Res, Heavy Truck Traffic, Heber
	US-89	Arizona Border	I-70, Sevier	0	191	191	2,000	1	3	3	2	9	1	Mighty 5, Rural, Lake Powell, Grand Canyon, AZ, I-15 Alternate
		I-70/Salina	US-6/Thistle	225	312	87	3,000	1	2	3	2	8	2	Central Utah Corridor, Alternate to I-15
State Routes	SR-24	I-15	I-70	0	122	122	2,500	1	3	3	1	8	1	Mighty 5, Rural, Interstate Connector
	SR-12	US-89	SR-24	0	160	160	2,000	1	3	3	1	8	1	Mighty 5, Rural, Corridor Connector.

4.3 Urban DCFC Analysis Results

The following table includes the result of using the EVI-Pro tool and a variety of EV ratios expressed as a percentage of the baseline 2016 light duty vehicle counts for the five urban areas available in the application. The summary is intended to provide an approximation of the EVSE needs. This can be useful for estimating, planning, and budgeting installations that meet the future need. Future spatial analysis will use GIS data to identify target zones based upon population/vehicle density, public buildings, and other datasets to help city planners start to determine specific locations. Individual charts can be found in Appedix C.

Additional resources and case studies are available at the Alternate Fuels Data Center (https://afdc.energy.gov/fuels/electricity.html).

Table 3: Urban Capacity Analysis

Urban Capacity

Assumptions

10% of alt fuel vehicles are Plug In Hybrid, 50-mile electric range
10% of alt fuel vehicles are All electric, 100 mile range
80% of alt fuel vehicles are All Electric, 250 mile range
Partial support of plug-in hybrids
Percent with home charging available: 80%

Vehicle Mix	2016 Light Duty	2%	5%	10%
Logan	80,400	1,608	4,020	8,040
Ogden-Layton	542,600	10,852	27,130	54,260
Provo-Orem	398,700	7,974	19,935	39,870
Salt Lake - West Valley	924,000	18,480	46,200	92,400
St. George	123,000	2,460	6,150	12,300
Workplace Level II Needs				
Logan		8	21	41
Ogden-Layton		55	133	263
Provo-Orem		39	97	188
Salt Lake - West Valley		85	201	397
St. George		12	31	61
Public Level II Needs				
Logan		7	17	32
Ogden-Layton		43	89	168
Provo-Orem		32	73	121
Salt Lake - West Valley		55	161	240
St. George		10	25	44
Public DCFC				
Logan		6	14	25
Ogden-Layton		34	58	88
Provo-Orem		26	55	73
Salt Lake - West Valley		33	66	110
St. George		9	20	32

5.0 Potential Action Items

There are many resources available on-line to help EVSE planners and designers during the planning and development process. This document identifies several of those resources within the body and in the appendix. If funding were to become available, the following is a proposed list of action items that merit consideration to help implement the Plan and improve coordination and policy.

5.1 EVSE Steering Committee

It is advisable that UDOT form a steering committee with the intent of meeting quarterly to discuss topics and strategies related to the implementation of the Statewide EV Charging Network Plan. Committee members may be asked to take ownership of certain topics to present to the group at each meeting. This will help ensure the latest trends and innovations are brought to the group and integrated into future Plan releases. Potential topics for quarterly discussion include:

- Building Codes, Government Policy, and Legislation.
- Trends and future needs for commerce and long-haul trucking.
- The state of EV Adoption and areas for improvement.
- Funding and innovative partnerships. These could be private, public or a combination.
- Grants and other research opportunities.
- Energy Storage, ESP rate schedules and general utility impacts.
- State Fleet conversion efforts and needs.
- Public awareness and tourism.

5.2 Remote site monitoring

Adding monitoring cameras at remote EVSE locations may provide additional security. UDOT currently contracts with a remote monitoring company that provides roadway cameras in remote areas to view road conditions (snow season). One such area for consideration is Ivie Creek Rest Area on I-70.

5.3 Improve datasets and modeling

EVSE station developers could partner with EVSE manufacturers to get analytical data from their charging infrastructure, such as unique user IDs using EVSE, home state, trips and other useful data that can help project future needs while also protecting user privacy. EVSE managers

can provide data analytics on EVSE usage, wait times, and other key data to help improve modeling and find targeted areas for improvements and capacity increases.

5.4 State fleet EV modeling

The State's Fleet could benefit from an additional review of the 2019 Sawatch Labs report titled "Electric Vehicle Suitability Assessment: State of Utah". The original report targeted vehicles that traveled under a limited mileage and returned to the same location for fleet charging each night. Additionally, all fleet vehicles that meet criteria should be equipped with data gathering technology that facilitates the identification of fleet vehicles that may be ideal for conversion to zero or low emission/Tier 3 fuel. The number of electric vehicle product offerings, the driving ranges of EVs, and the availability of DCFC chargers have increased significantly since the Sawatch Labs report was published. We recommend that State Fleet vehicle makeup should be evaluated anew to identify potential benefits from the rapidly developing EVSE network.

A comprehensive review of fleet vehicles will also help identify locations for new or additional EVSE at government office locations.

5.5 Fee collection at State-owned EVSE

Obtaining legislative authority to collect fees at state owned EVSE is a key element of the Plan's successful implementation, given the need to provide a level playing field for all station developers and achieve the ultimate goal of eventually privatizing or granting a concession to a private vendor to operate and maintain state owned EVSE as feasible. Currently, state-owned EV chargers are free to the public. This may be acceptable in the near term, as it helps to support accelerated EV adoption and economic development in rural Utah. However, ongoing free EV charging will eventually have a detrimental impact on the feasibility for the private sector to manage state EVSE or install privately funded EVSE (it is difficult to convince people to pay for electricity when it is offered for free nearby). Government created EVSE block out zones inhibit the market from operating efficiently and discourage private investment in increasing EVSE capacity (Priority 2). It is also prudent and fiscally responsible to enable the State to perform cost recovery to offset the costs of electricity, maintenance, and eventual equipment replacement.

5.6 Building code updates

Planning for a future that includes significant increases in electric vehicles is benefited by prescribing EV infrastructure design into new construction. This "everything starting now forward" approach will help avoid costly retrofits of relatively new construction. Currently, Salt Lake City addresses multi-tenant EVSE in its Off Street Parking, Mobility, and Loading

document (Link). Another useful summary of EV Infrastructure building codes is the Southwest Energy Efficiency Project (link).

5.7 Public/Employee relations

A well-executed Public Relations campaign could promote the EV mobility network and help educate the public on this evolving alternative fuel transportation option. A parallel campaign could focus on government employees and the paradigm shift towards how best to effectuate the public's business in an EV.

5.8 Consider providing flexibility for EVSE target spacing

Allowing some exceptions to the 50-mile target spacing would allow for more practical and cost-effective use of funds in the early stages of deployment. In some instances, the space between logical installation locations is either of minimal value (see 55-mile gap below), or not currently cost effective. Many stretches of Interstate 70 lack any electrical infrastructure and in one instance, no developed areas to install. These sites would require pavement, bathroom facilities, lighting and solar power. UDOT recommends that although these sites would not be developed initially, but be evaluated for alternative solutions, such as lower powered level II "safety net" solutions.

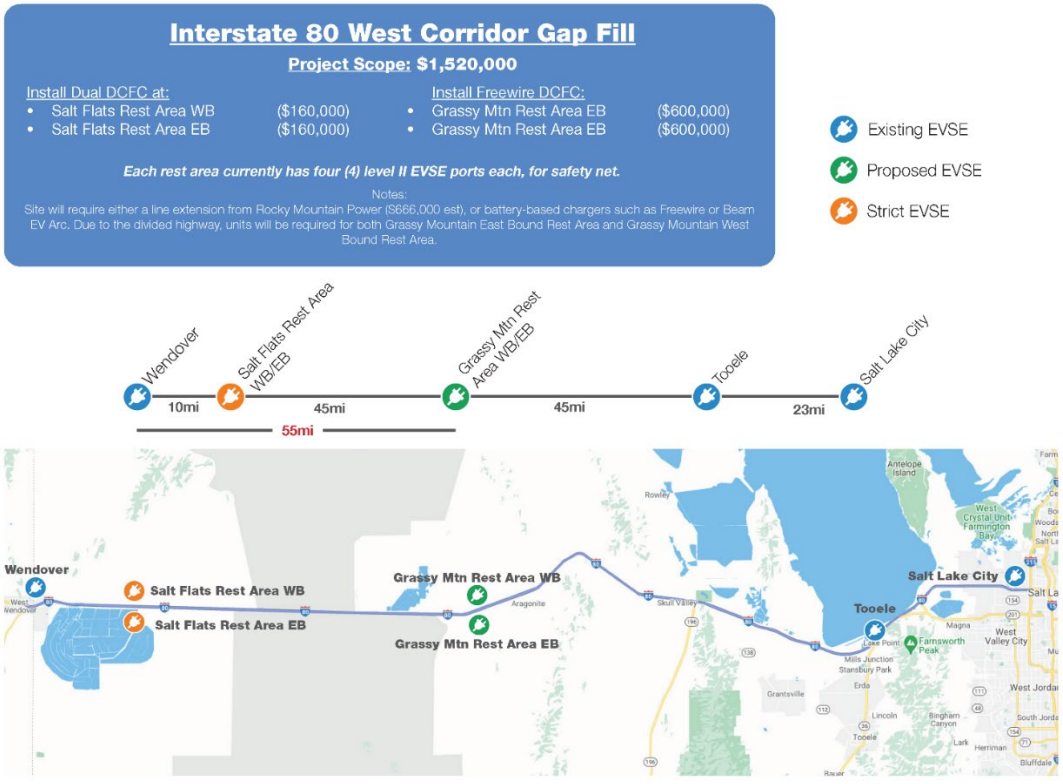


Figure 1: EVSE Gap map, showing minimal benefit in some instances (Salt Flats)

5.9 Port standardization/agnostic EVSE installation

We recommend any EVSE installed with government funding be open source and non-proprietary. Tesla vehicles use a proprietary network and port connector that is not available to other EVs, but Teslas are equipped to use non-Tesla EVSE by use of an adapter. New and upstart EV manufacturers may be inclined to follow the Tesla business model by offering exclusive infrastructure (imagine Ford owned gas stations that only sell gas to Ford owners). The exclusivity approach has the potential to compete with public chargers for real estate and grid capacity. The public is benefitted when all EVs may use all EVSE.

The European Union has adopted the CCS Combo 2 charge port as their standard. Because of this, and for other reasons, Tesla is now manufacturing its cars with the CCS Combo 2. This Plan recommends that all publicly funded installations should be port agnostic (CCS/CHAdeMO/J1772) and provide charging ports that all EVs can use.

5.10 Issue a Request for Information (RFI)

UDOT could issue a Request for Information (RFI), targeting EVSE manufacturers/integrators and EV manufacturers. The RFI process is a non-contractual request for information. The steering committee would help craft the question bank and resulting information will be shared. Because the EVSE and EV industry as a whole are quickly evolving and innovating, it is important to stay informed about opportunities and unique products. Some possible question groups in the RFI include:

- Responder's experience with Public-Private Partnerships for EVSE
- Responder's solution to lack of adequate power source on site
- Responder's recommendations for ideal EVSE site host criteria
- Responder's experience with integrated energy storage and possible ROI calculations.
- Responder's experience with modeling calculations for urban EVSE siting

6.0: Gap Funding Needs (50 mile spacing):

The following table is a summary of the proposed EVSE and an estimated cost for Gap filling along key corridors. Costs were based on the previous EVSE project that UDOT implemented under the Volkswagen Mitigation Trust grant that was administered by the Utah Department of Air Quality. Solar and battery storage types (Freewire) were estimated using recent bids from surrounding states. The estimates are a general estimate and sites will vary in cost based on a variety of factors including, necessary utility upgrades, site improvements and/or any private-public partnership opportunities developed during the planning an implementation process.

UDOT is also proposing an alternative flexible option where some of the sites are temporarily removed from the list such that other more cost-effective sites can be developed. Suggested sites to delay include locations with no existing electrical and/or civil infrastructure, remote sites that will need a solar (or generator) solution, and sites that fill minimal gap spacing (i.e. filling a 55 mile gap to hit an ideal spacing of 50 miles).

Until more cost-effective solutions are available, UDOT recommends using the savings to provide additional capacity along major corridors to help mitigate high usage times as more EVs are adopted. Sites that are delayed will continued to be evaluated based upon EV adoption rates, travel patterns, grant opportunities, possible combination with roadway projects in the area and other factors.

(TABLE ON NEXT PAGE)

TABLE 4: FUNDING OPTIONS (50-MILE VS. FLEX):

EVSE Investment Options: Strict 50 Mile vs. Flex Option					
Route	**Location**	**Scope**	**50 Mile Option**	**Flex Option**	**NOTES**
I-70	Cove Fort	4 DCFC	$ 265,000	$ 265,000	
$2,795,000	Ivie Creek	4 DCFC	$ 265,000	$ 265,000	Not including RMP upgrade power ($160,000)
	Crescent Jct	4 DCFC	$ 265,000	$ 265,000	(May Consider Thompson, some backtracking)
	Ghost Rocks R/A EB	Solar Power DCFC	$ 500,000		BLM Approval Needed
	Ghost Rocks R/A WB	Solar Power DCFC	$ 500,000		BLM Approval Needed
	Ranch Exit	Solar Power DCFC	$ 1,000,000		Civil Site development (New pavement, drainage, evironmental)
I-80	Grassy R/A EB	2 Freewire DCFC / RMP	$ 600,000	$ 600,000	Site has 4 level 2 for security net
$1,520,000	Grassy R/A WB	2 Freewire DCFC / RMP	$ 600,000	$ 600,000	Site has 4 level 2 for security net
	Salt Flats R/A EB	2 DCFC	$ 160,000		fills minimal gap filling between Grassy and Wendover
	Salt Flats R/A WB	2DCFC	$ 160,000		fills minimal gap filling between Grassy and Wendover
US-40, US-191	Heber	4 DCFC	$ 265,000	$ 265,000	
$1,855,000	Duchesne	4 DCFC	$ 265,000	$ 265,000	Needed to complete US-191 Central
	Vernal	4 DCFC	$ 265,000	$ 265,000	
	Fruitland	4 DCFC	$ 265,000	$ 265,000	Possibly use Pinion Ridge Rest Area
	Myton	4 DCFC	$ 265,000	$ 265,000	
	Dutch John	4 DCFC	$ 265,000	$ 265,000	
	Helper	4 DCFC	$ 265,000	$ 265,000	Needed to complete US-191 Central
US-50/6	Delta	4 DCFC	$ 265,000	$ 265,000	
$925,000	Eureka	2 DCFC	$ 160,000	$ 160,000	Possibly sited at Eureka Maintenance Station
	Skull Rock M/S	Solar Power DCFC	$ 500,000		Security, BLM, Environmental, Modify Maintenance Yard
US-6	Tie Fork R/A	2 Freewire DCFC	$ 600,000	$ 600,000	Site already has 4 level 2 for security net
$1,100,000	Horse Canyon	Solar Power DCFC	$ 500,000		Civil Site development (New pavement, drainage, evironmental)
	Huntington	4 DCFC	$ 265,000	$ 265,000	Provide alternate route to SR-6 (see wildfire closure)
US-191 South	Kane Springs R/A	2 Freewire DCFC	$ 600,000		minimal gap filling between Monticello and Moab
$600,000					
US-89 North	Fairview	4 DCFC	$ 265,000	$ 265,000	Connects SR31 to SR10 and Price as alternate route to US6
$530,000	Ephraim	4 DCFC	$ 265,000	$ 265,000	
US-89 South	Panguich	4 DCFC	$ 265,000	$ 265,000	
$1,060,000	Junction	4 DCFC	$ 265,000	$ 265,000	
	Orderville	4 DCFC	$ 265,000	$ 265,000	
	Paria River Ranch	4 DCFC	$ 265,000	$ 265,000	3 phase power access
SR-12	Bryce City	4 DCFC	$ 265,000	$ 265,000	
$795,000	Escalante	4 DCFC	$ 265,000	$ 265,000	
	Boulder	4 DCFC	$ 265,000	$ 265,000	
SR-24	Torrey	4 DCFC	$ 265,000	$ 265,000	
$1,295,000	Hanksville	4 DCFC	$ 265,000	$ 265,000	
	Loa	4 DCFC	$ 265,000	$ 265,000	
	Goblin Valley S/P	Solar Power DCFC	$ 500,000	$ 500,000	BLM, Environmental
		Project Totals	**$12,740,000**	**$ 8,820,000**	
		Site Count	**37**	**29**	

7.0 Conclusion

With the rapid paced, global shift to electrified transportation underway, some are wondering what the role of government should be. Auto manufacturers across the board are making "no going back" commitments to electrification and investing billions of dollars to bring about a once in a century modernization of surface transportation. Many nations and several states are setting zero transportation emission goals to address energy independence, climate, and air pollution.

With increasing urgency, federal, state, and local governments are grappling with the many new and unique challenges that must be addressed to help with a quickly approaching market shift to electrified transportation. A few challenges include:

- What is the role of government and investment needed, to support EV adoption to ensure minimal inconvenience and maximum benefits to their constituents and the economy?
- How and when will privatization of EVSE take place?
- How to continue funding roadway maintenance and construction?
- What impact will electrification have on the electrical grid (reliability/resilience)?
- How will private and government fleets make the transition?
- What building code updates are necessary to bring EVSE to multi-tenant building residents?
- How to support, and bring opportunities to low-income households and underserved communities?

This report was commissioned to establish a plan to develop the core EVSE mobility network on key Utah highways. The Plan presents a foundational 50-mile spacing EVSE network that supports tourism, rural communities, and regional connectivity.

Development of the statewide EVSE mobility network will help ensure Utah's businesses, citizens and visitors have much improved access to vehicle charging options. Although this initial gap filling process will help improve EV adoption and boost consumer confidence, there is also a growing need to build out more EVSE capacity along key corridors and in urban areas. EVSE installations, both urban and rural, should trend along with EV adoption and utilization. Prudent and thoughtful planning are critical for providing the foundational framework that can expand as demand grows.

Mass adoption of electric vehicles will require significant and ongoing planning and coordination among stakeholders and planners to meet the growing EVSE infrastructure needs. Along with early baseline investment needs identified in this document, the other main takeaway is the need to promote strategic coordination among stakeholders.

It is recommended that a Utah EV technical working group be established to help evaluate core issues and make pragmatic and timely recommendations to policy makers and leaders. This working group can provide direction on areas of planning needs, public outreach, growth studies, building codes, utility engagement, equity, privatization, and other pertinent topics. The working group would develop strategic objectives and recommendations to help policy makers make informed decisions that help navigate the many electrification challenges that are rapidly approaching.

Finally, UDOT has identified a base budget needed to fulfill the objectives of completing a statewide EVSE charging network as mandated in HB259. It has also provided a second "Flex Funding" option that provides some flexibility by allowing development of more cost effective and useful sites initially and continuing to monitor EVSE utilization, EV adoption and funding opportunities that may raise the need to provide more costly infrastructure upgrades. It is also recommended that efforts be made to leverage any state funding towards grants, public-private-partnerships, innovative contracting, and other opportunities to maximize the value of the investments being made.

Appendix A: EVSE Modeling and Datasets

A.1 Identifying Key Corridors for Development

Key corridors were evaluated by UDOT and included based on their destination, traffic flow and connectivity to the overall EVSE network.

A.2 Corridor Pending (Electric)

This is a corridor that has been identified as being desirable and useful for the development of alternative fuel infrastructure. A corridor or corridor segment will remain pending until a minimum 50-mile spacing of DCFC infrastructure is met.

A.3 Corridor Ready (Electric)

Corridor ready identifies corridors that meet the required 50-mile spacing of EVSE. These corridors are eligible for mainline signage to identify fueling opportunities for Alternative Fuel Vehicles using electricity as fuel.

The alternative fuel corridors are a primary foundation of Utah's Statewide EV Charging Plan. Although some corridors have yet to be designated by the FHWA, UDOT is planning to continue to nominate them as future rounds are announced. The routes evaluated in this plan are a complete list of current and future nominated routes.

Given the spatial nature of the EV network, UDOT determined it would be best to perform its analysis using the ESRI Geographic Information System (GIS) as the primary modeling and analysis tool. This allows multiple datasets to be included and analyzed with respect to location and other spatial features.

Some of the data sets used in the GIS tool include:

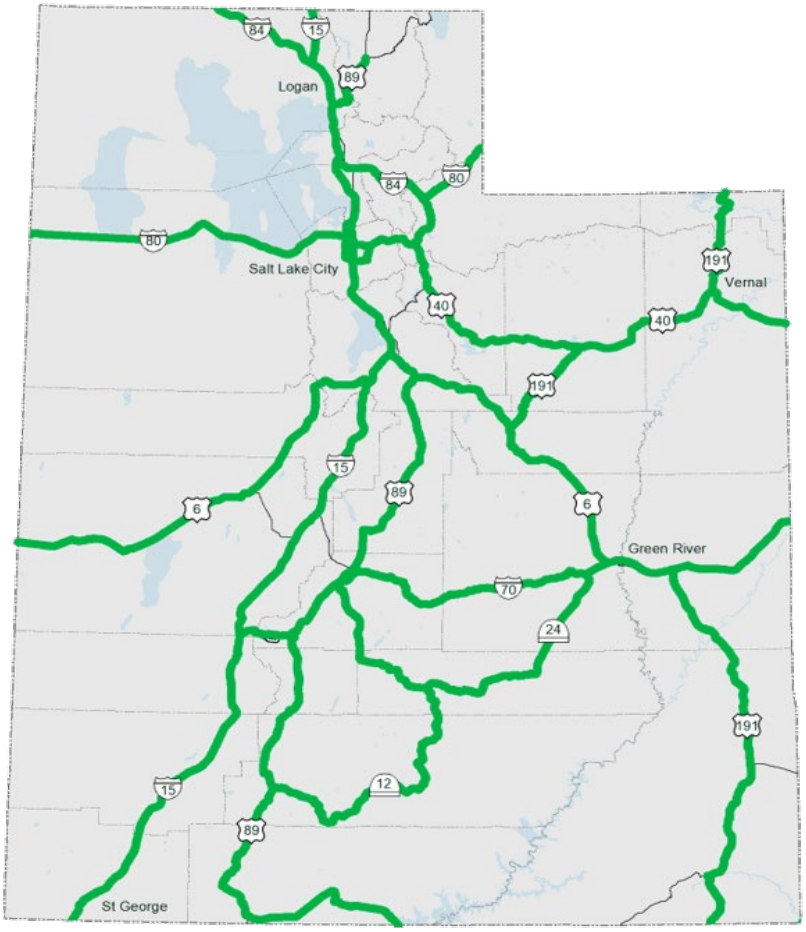
- Alternative Fuel Corridors
- Average Annual Daily Traffic (AADT)
- Energy Service Provider territories
- National Parks/Monuments/Recreation areas/Forests.
- State Parks
- Points of Interest (Lakes, museums, golf courses, etc.)

Additional Datasets will be included during the Phase IV - EV Charging Capacity analysis to help model holidays, weekends, and other considerations. Further, UDOT will seek to obtain analytics from EVSE vendors to help determine peak usage, possible queuing issues and other operational data points that would inform future prioritized EVSE installations.

A.4 Urban DCFC

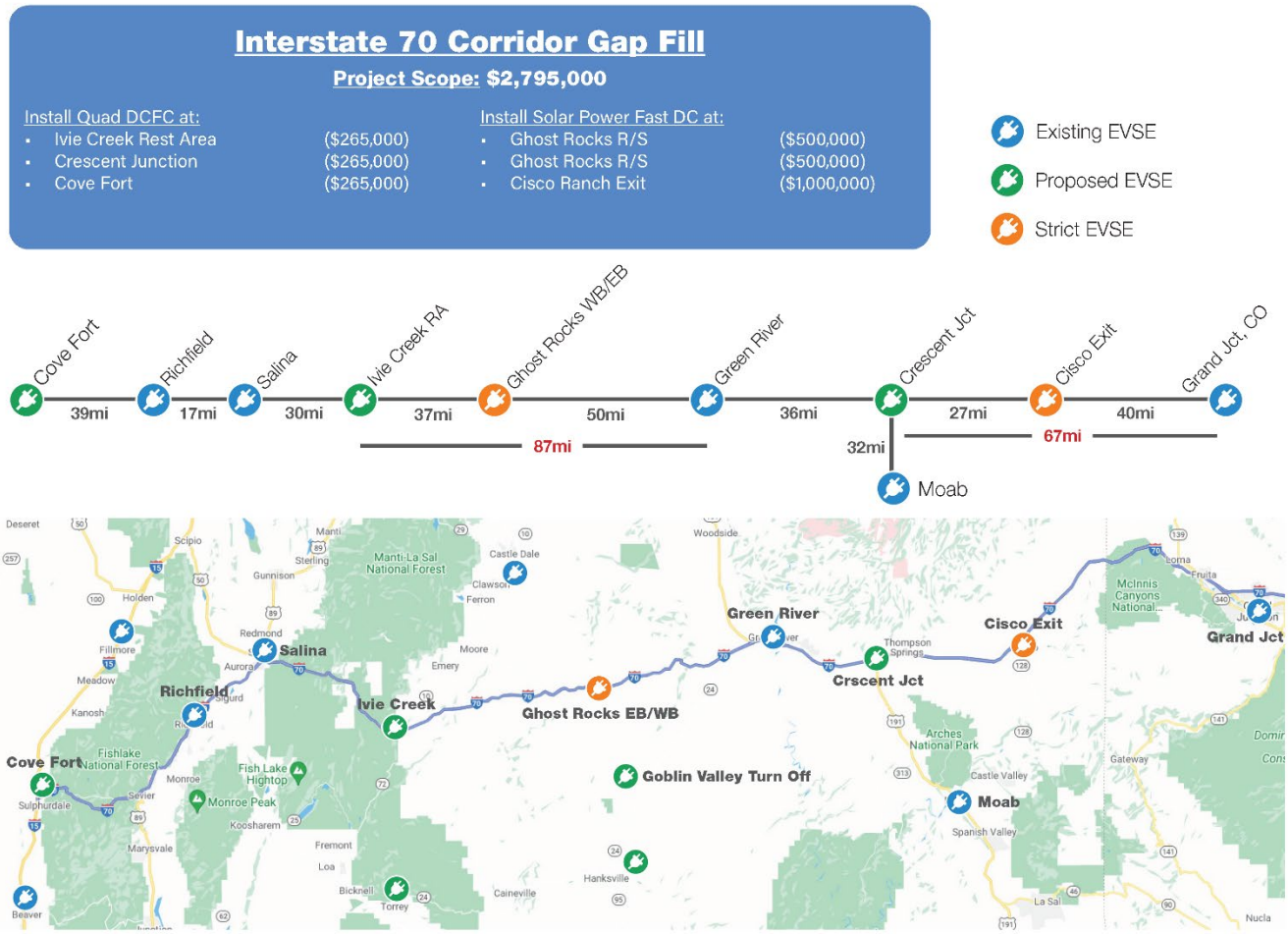
Urban EVSE needs were analyzed using the U.S. Department of Energy's EVI-Pro Tool that is available through the Alternative Fuels Data Center (https://afdc.energy.gov/evi-pro-lite).

This analysis tool looks at light duty vehicle mix based on 2016 total light duty count data. Light duty vehicles are considered passenger and cargo vehicles with a GVWR of less than 10,000 pounds. The urban areas analyzed include Logan, Ogden-Layton, Salt Lake City-West Valley City, Provo-Orem, and St. George. Results can be used to extrapolate EVSE needs in other cities around the state. For the purposes of this analysis, it was assumed that 80% of EV owners would have access to at home charging. Actual high density and multi-tenant values will impact this ratio. The model is limited to 10% electric vehicle ownership.



Utah's Nominated Alternative Fuel Corridors (Electric)

Appendix B: Corridor Maps



Interstate 80 West Corridor Gap Fill

Project Scope: $1,520,000

Install Dual DCFC at:		Install Freewire DCFC:	
• Salt Flats Rest Area WB	($160,000)	• Grassy Mtn Rest Area EB	($600,000)
• Salt Flats Rest Area EB	($160,000)	• Grassy Mtn Rest Area EB	($600,000)

Each rest area currently has four (4) level II EVSE ports each, for safety net.

Notes:
Site will require either a line extension from Rocky Mountain Power ($666,000 est), or battery-based chargers such as Freewire or Beam EV Arc. Due to the divided highway, units will be required for both Grassy Mountain East Bound Rest Area and Grassy Mountain West Bound Rest Area.

Existing EVSE
Proposed EVSE
Strict EVSE

SR 12 Corridor Gap Fill

Project Scope: $795,000

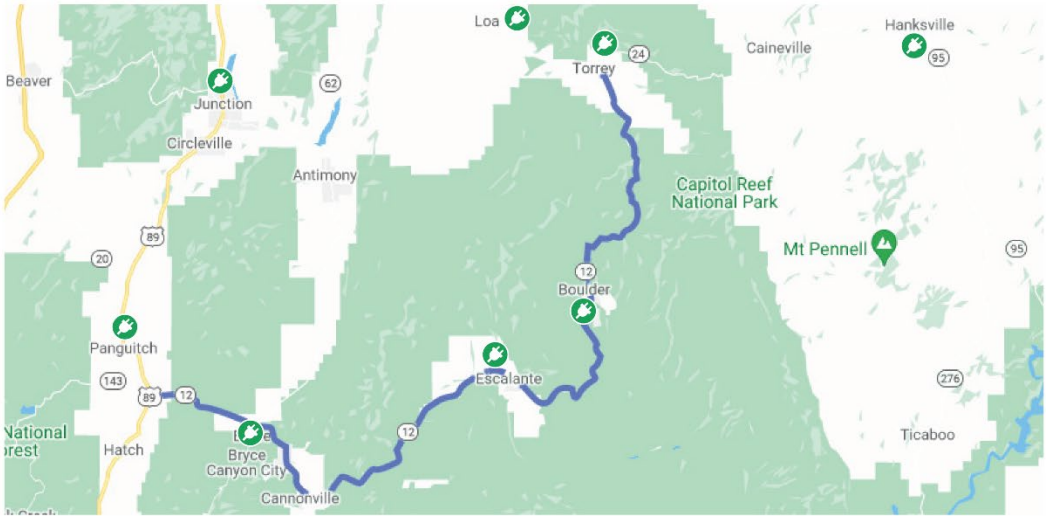
Install Quad DCFC at:

- Bryce City ($265,000)
- Escalante ($265,000)
- Boulder ($265,000)

Notes: Torrey also covers SR24. Panguich, Junction, and Hanksville needed on other corridors

Existing EVSE

Proposed EVSE



SR 24 Corridor Gap Fill

Project Scope: $1,295,000

Install Dual DCFC at:

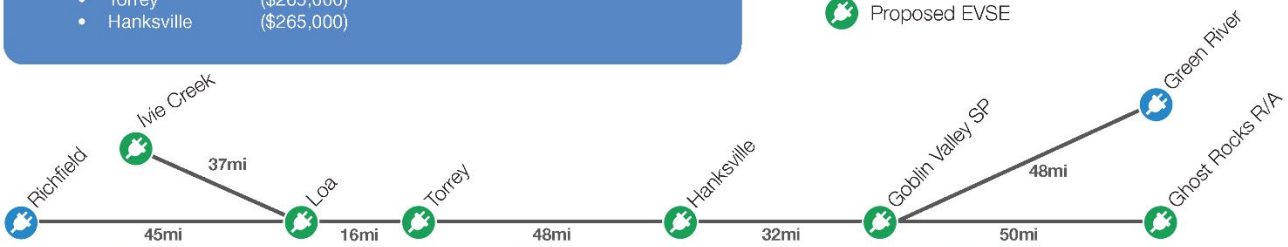
- Loa ($265,000)
- Torrey ($265,000)
- Hanksville ($265,000)

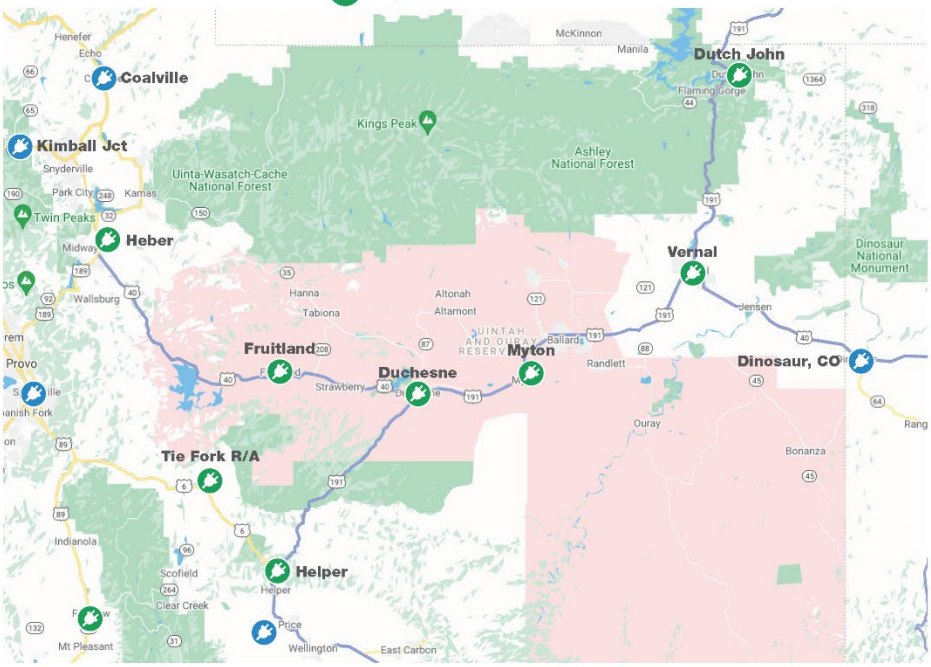
Install Solar DCFC at:

- Goblin Valley ($500,000)

Existing EVSE

Proposed EVSE





US-40 & US-191 North Corridor Gap Fill

Project Scope: $1,855,000

Install Quad DCFC at:

- Heber ($265,000)
- Myton ($265,000)
- Fruitland ($265,000)
- Vernal ($265,000)
- Duchesne ($265,000)
- Dutch John ($265,000)
- Helper ($265,000)

Existing EVSE

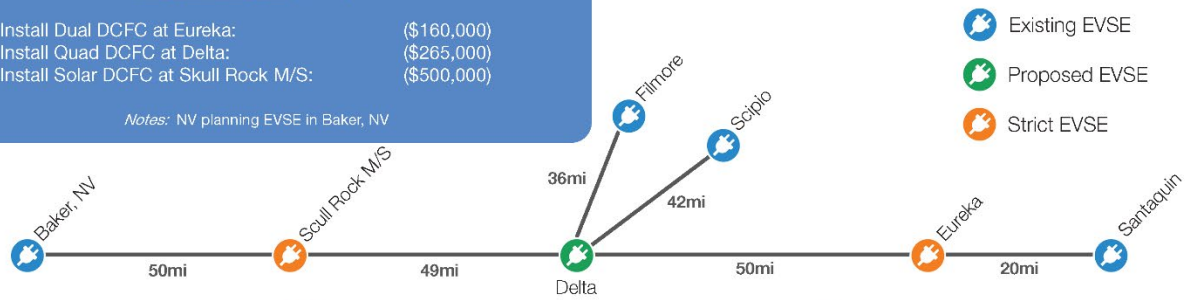
Proposed EVSE

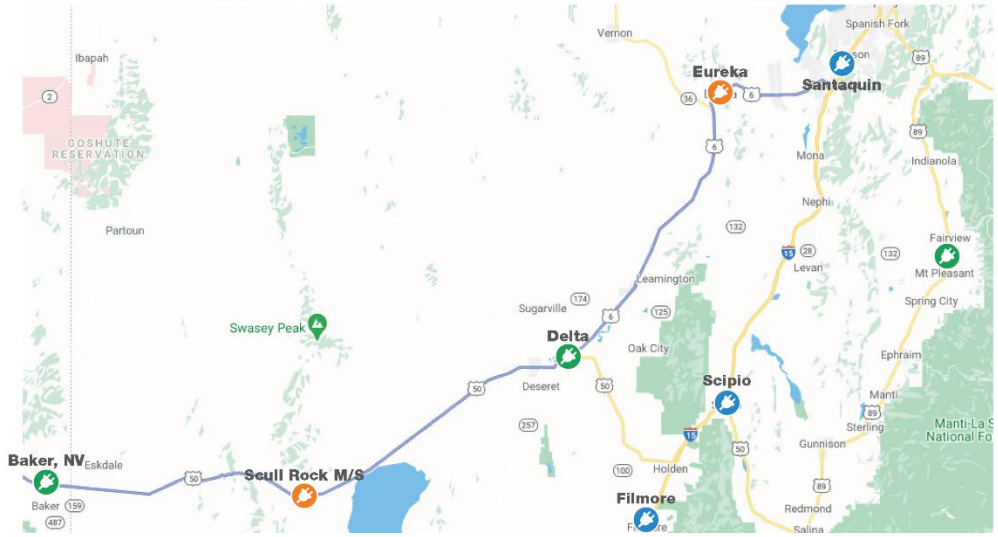
US-6/US-50 West Corridor Gap Fill

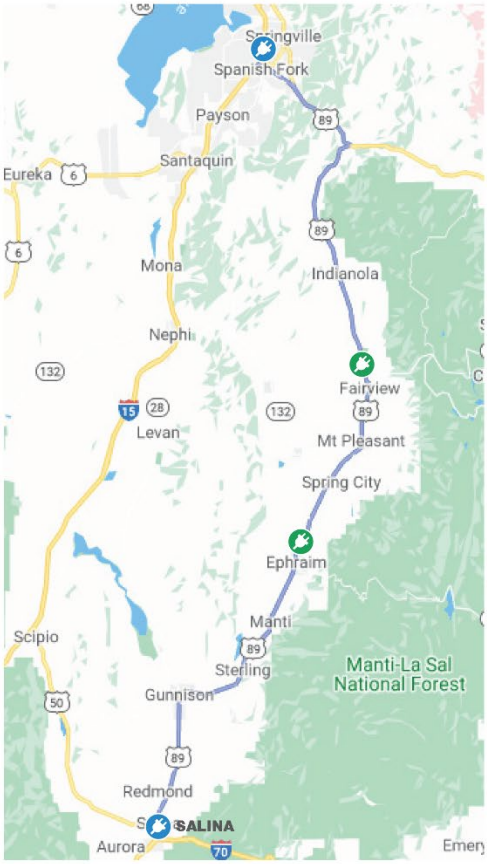
Project Scope: $925,000

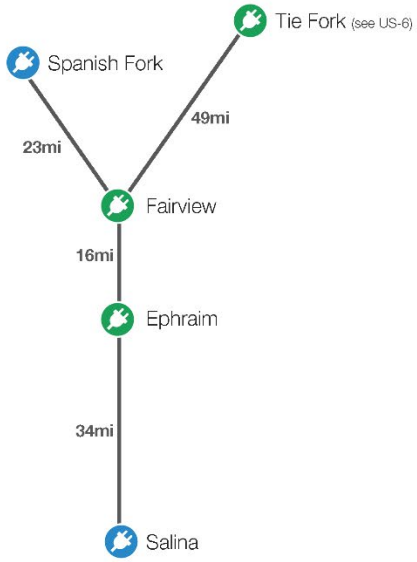
Install Dual DCFC at Eureka:	($160,000)
Install Quad DCFC at Delta:	($265,000)
Install Solar DCFC at Skull Rock M/S:	($500,000)

Notes: NV planning EVSE in Baker, NV









Existing EVSE

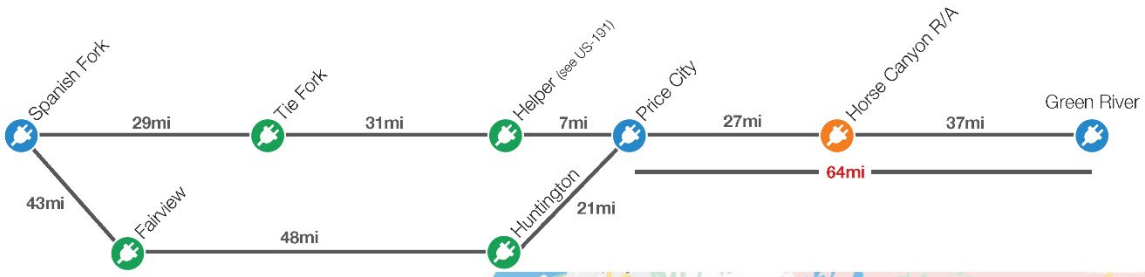
Proposed EVSE

US-89 Central Gap Fill

Project Scope: $530,000

Install Quad DCFC at:

Fairview	($265,000)
Ephraim	($265,000)



Existing EVSE

Proposed EVSE

Strict EVSE

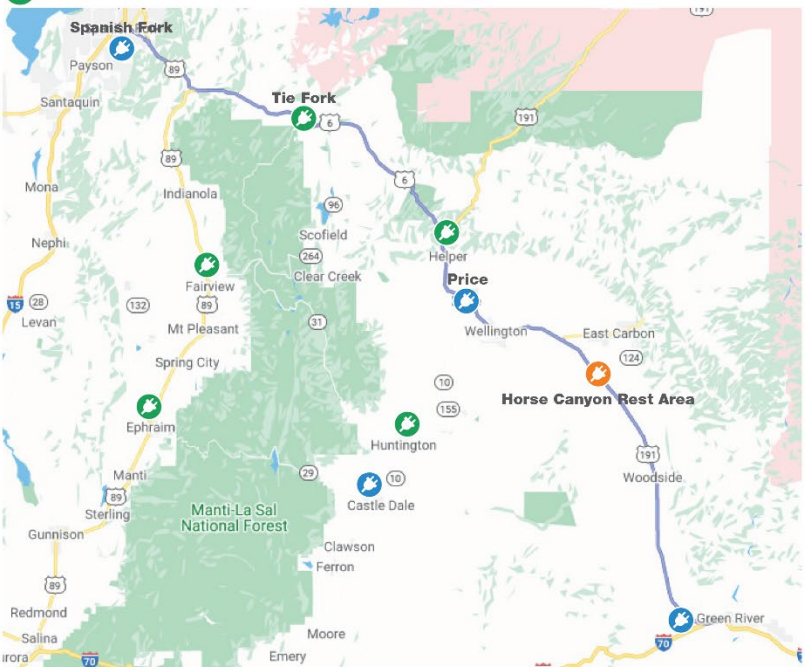
US-6 Central Corridor Gap Fill

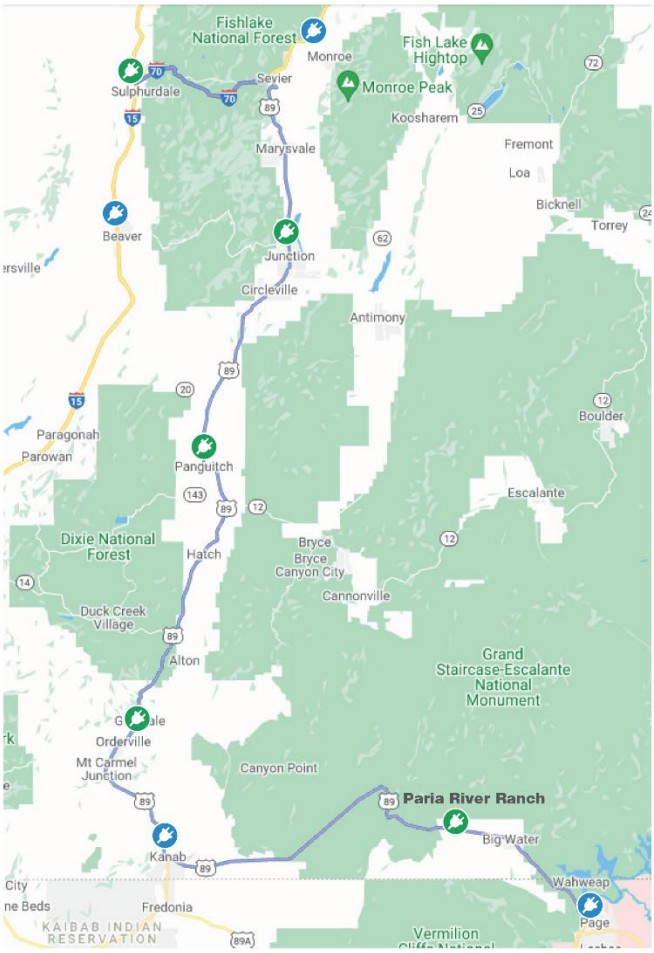
Project Scope: $1,100,000

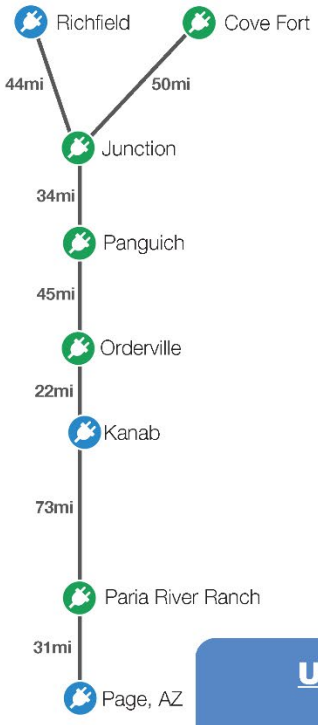
Install Freewire DCFC at
- Tie Fork Rest Area: ($600,000)

Install Solar DCFC at
- Horse Canyon Rest Area: ($500,000)

Install Quad DCFC at
- Huntington (alt route): ($265,000)







Existing EVSE

Proposed EVSE

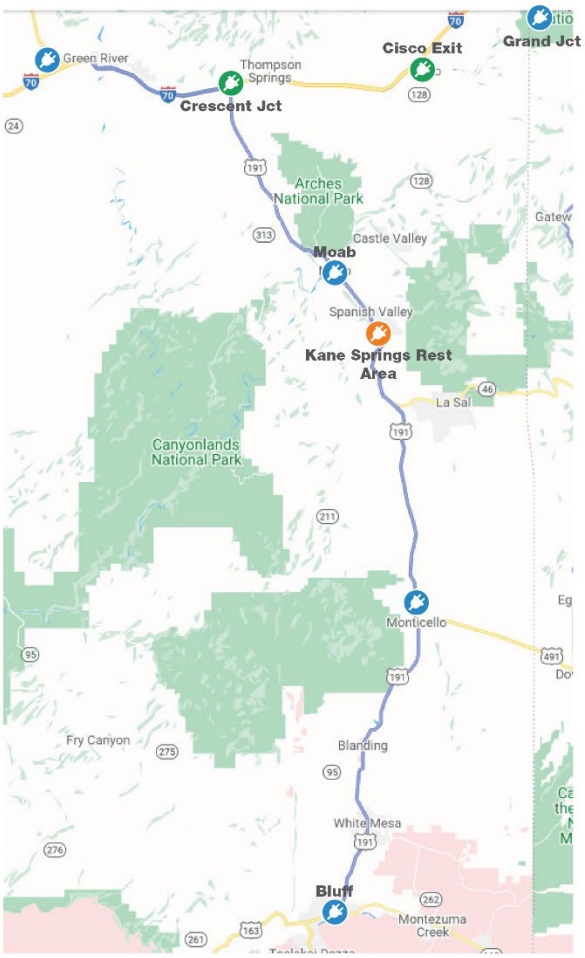
US-89 South Gap Fill

Project Scope: $1,060,000

Install Quad DCFC at:

- Orderville ($265,000)
- Panguich ($265,000)
- Junction ($265,000)
- Paria River Ranch ($265,000)

Notes: SR-153 is seasonal



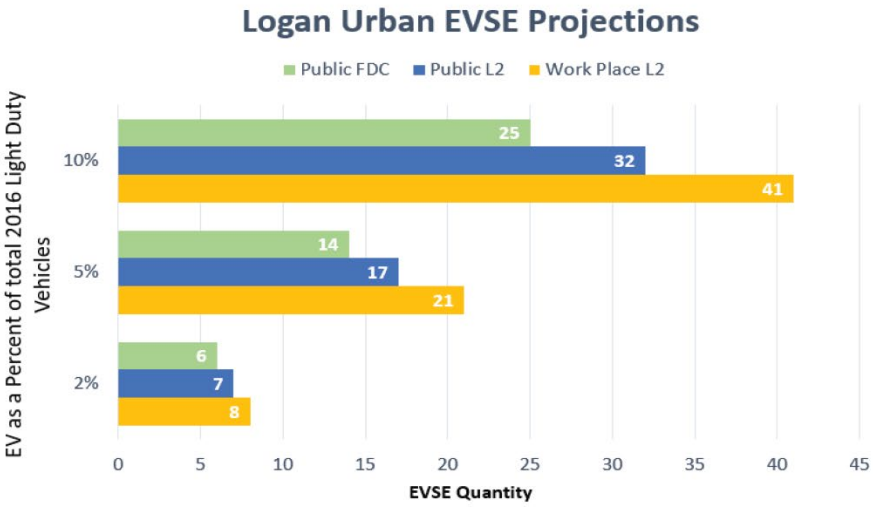
Existing EVSE
Proposed EVSE
Strict EVSE

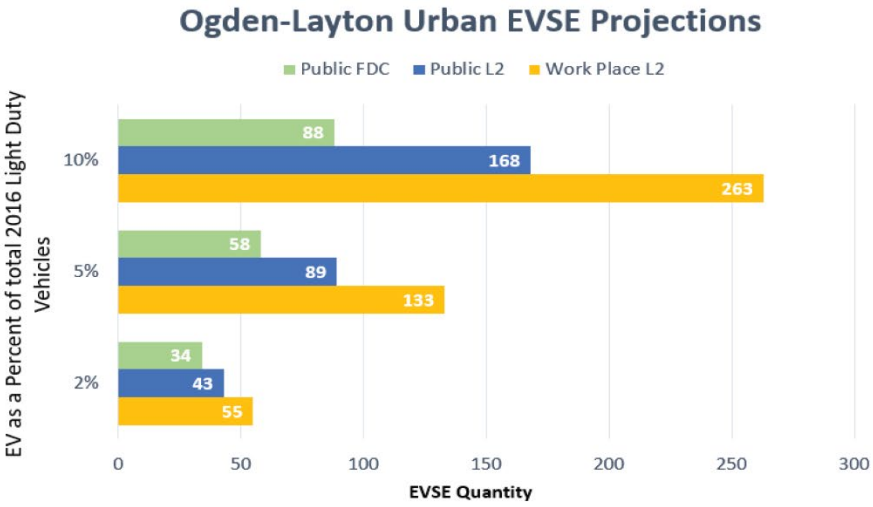
US-191 Corridor Gap Fill

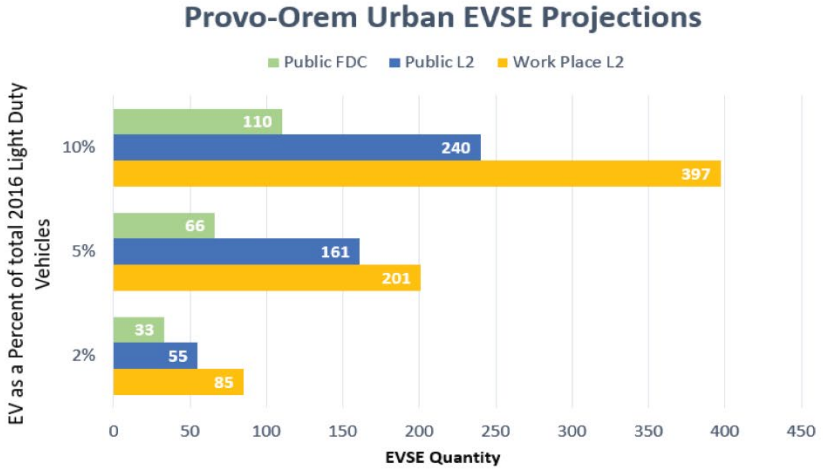
Project Scope: $600,000

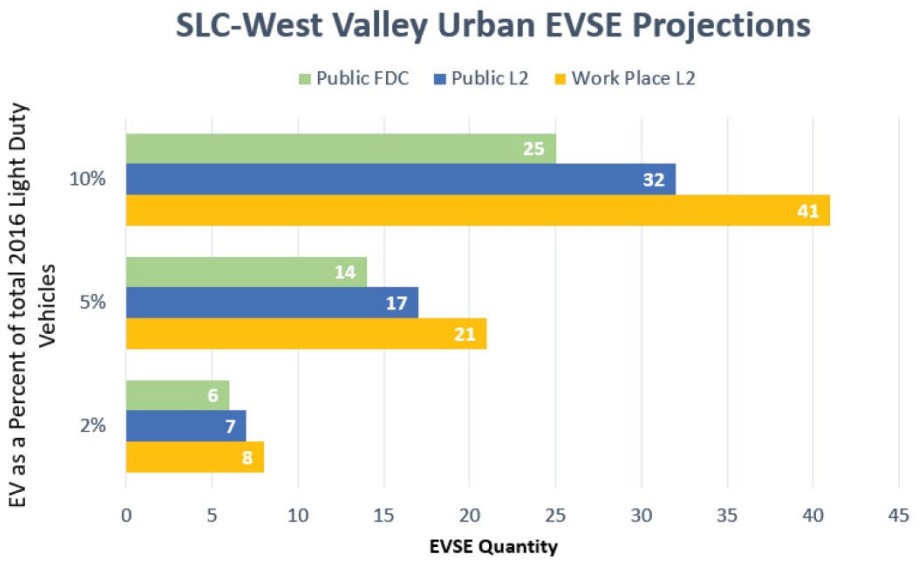
Install Freewire DCFC at:
Kane Springs Rest Area ($600,000)

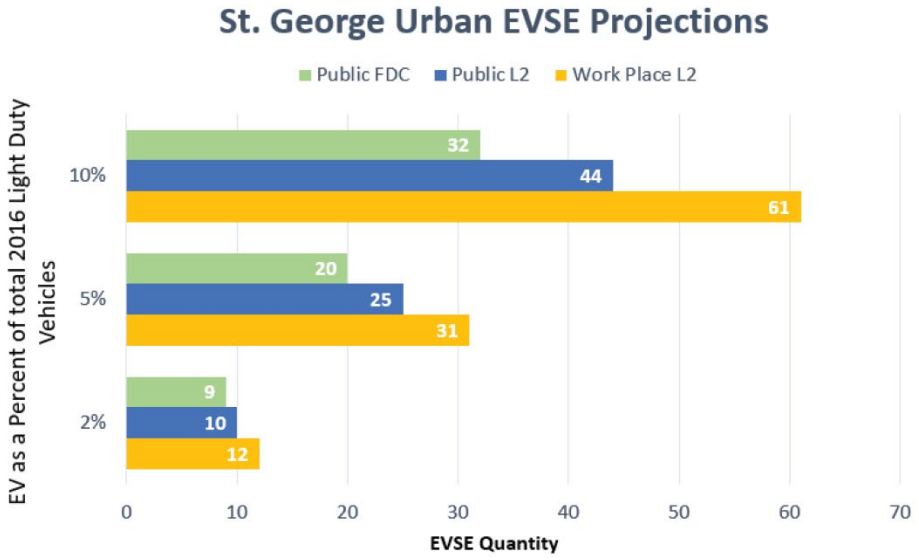
Appendix C: Urban EVSE Needs








SLC-West Valley Urban EVSE Projections
Public FDC
Public L2
Work Place L2
EV as a Percent of total 2016 Light Duty Vehicles
10%
5%
2%
25
32
41
14
17
21
6
7
8
0
5
10
15
20
25
30
35
40
45
EVSE Quantity


St. George Urban EVSE Projections
Public FDC
Public L2
Work Place L2
EV as a Percent of total 2016 Light Duty Vehicles
10%
5%
2%
32
44
61
20
25
31
9
10
12
0
10
20
30
40
50
60
70
EVSE Quantity

Appendix D: Plan Benefits

D.1 Fill Gaps, Complete Corridors, Create Connection and Enhancement within the Region

In 2019, Governor Gary Herbert joined the governors of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, and Wyoming to sign an updated Memorandum of Understanding (MOU) for Regional Electrical Vehicle Plan for the West (REV West) with a goal to enable drivers to "seamlessly drive an electric vehicle across the Signatory States' major transportation corridors." The new MOU builds on lessons learned by the REV West states as they work together to encourage public and private sector investment in electric vehicle charging stations to help grow EV adoption in the region. The REV West partnership also released Voluntary Minimum Standards for Direct-Current Fast Charging (DCFC) stations, covering administration, interoperability, operations, and management. This information can serve as guidance for station developers, public entities, and businesses looking to build EV charging stations (link).

D.2 Improved EV Travel Experience

Utah continues to add more EVs onto its roads, and the continued build out of electric infrastructure is greatly needed for Utah commuters and businesses. Additionally, Utah continues to be a popular travel destination especially for those seeking outdoor recreation.

As Utah continues to be a popular location for travel, especially for those wanting to experience the great outdoors, the increased ease of EV travel through improved infrastructure will facilitate access to Utah's range of visitor destinations, from popular sites such as The Mighty 5® national parks of Southern Utah to all the national monuments, recreation areas, forests, state parks, open spaces, and cultural offerings along the way. By targeting priority locations at gateway and base camp towns with opportunities to dine or explore nearby cultural attractions while charging, improved EV infrastructure can further support economic growth in Utah's rural communities.

D.3 Improved Air Quality

Every action in this plan supports Utah's ongoing goal to decrease emissions through vehicle transportation as an effort to improve air quality and quality of life for Utah. Motor vehicles are the largest source of emissions in the state. Electrifying transportation will assist with reducing emissions that contribute to both ozone and particulate matter 2.5 ($PM_{2.5}$). Vehicle emissions from both urban and local areas also play a role in contributing to visibility impairment (known

as regional haze) in our national parks and other scenic areas. Vehicle electrification can help improve our experience when we visit these treasured natural areas by improving visibility as well as reducing noise impacts and vehicle congestion.

D.4 Building Fuel Resilience

The State of Utah encourages building resilience across transportation operations. Through diversified transportation options, the State of Utah can enhance fleet operations and be better prepared to withstand fuel disruptions. Electric Vehicle Supply Equipment (EVSE) can also be made more resilient to grid disruptions with onsite energy generation and storage.

Appendix E: EVSE Types

E.1 Charger Types

There are multiple configurations of EVSE power output, power source and charge port connector types.

- **Level I:**
  - 120 Volt, 1.3kW to 2.4kW output.
  - 3-5 miles of range per hour charged.
  - J-1772 Connector Port
  - Home or emergency charger

- **Level II:**
  - 208-240 Volt, 3kW to 19kW output.
  - 18-28 miles of range per hour charged.
  - J-1772 Connector Port

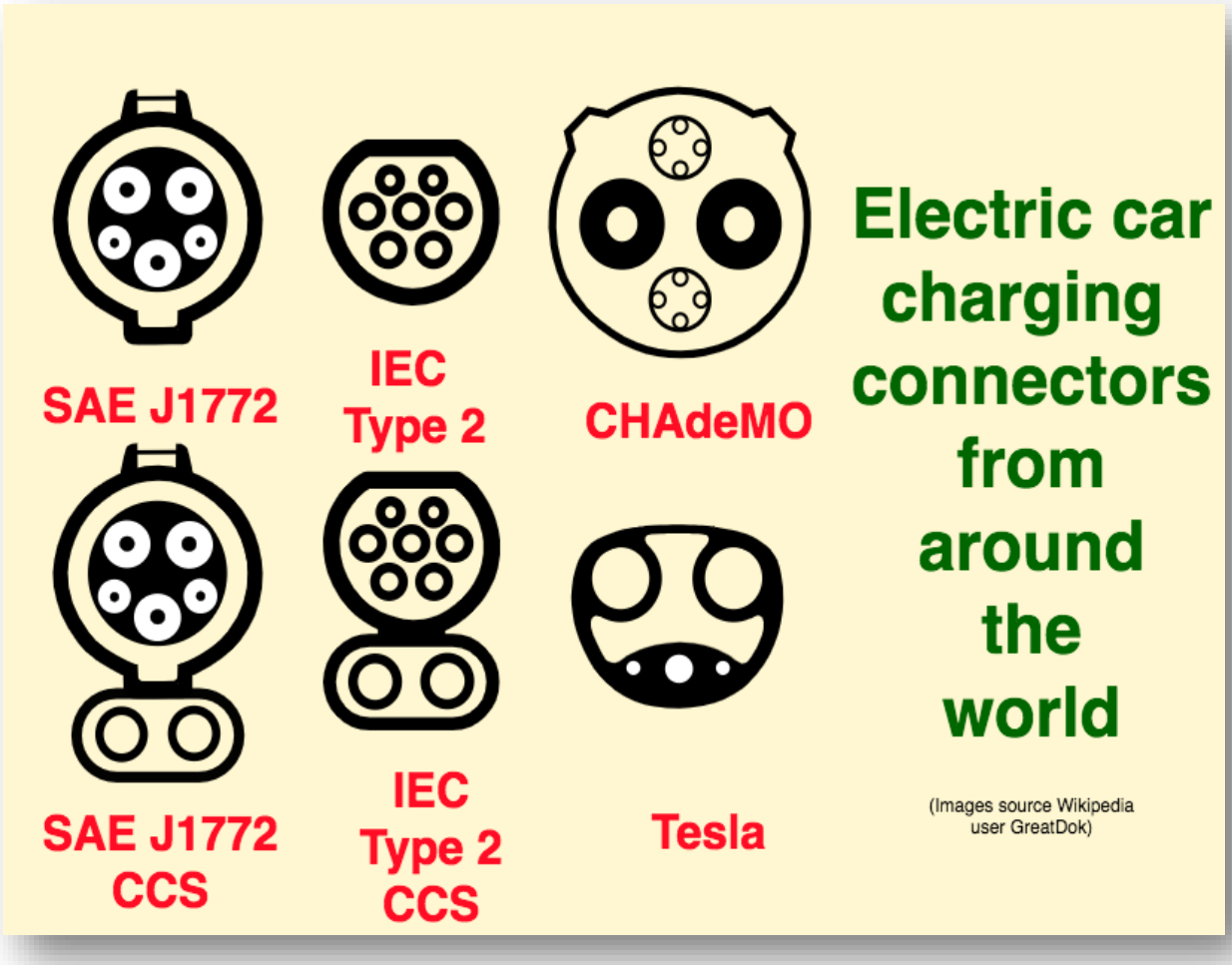
- **Level III (Direct Current Fast Charger DCFC)**
  - 480 Volt/3-ph power, or battery-based system.
  - Output up 50kW to 350kW
  - 100+ miles of range per 15-minute period.
  - Power tappers after 80% battery state of charge
  - CCS-Combo, Tesla, CHAdeMO connectors.

One of the key features that separate Level I/II from DCFC is how the charge is being sent to the battery pack. Level I/II chargers use the vehicles onboard charger to covert the utility grid's Alternating Current (AC) source to Direct Current at the vehicle pack voltage. DCFC chargers do the conversion from AC to DC internally (off-board charger). Thus, DC power is flowing from the charger to the vehicle battery pack. DCFC chargers generally have a broad range of DC voltage output to work with vehicles up to 900 volts DC.

E.2 EVSE Connector / Plug Types.

There are three main connector types currently being installed by manufacturers. Each has limitations on the amperage (power) that can be sent through the cable and plugs.

J-1772 plug is the base plug that accommodates Level I and Level II charger CHAdeMO is a charger plug configuration common with Nissan, Hyundai, Mitsubishi. The standard was largely adopted by several Asian manufactures. Tesla also offers a CHAdeMO adapter for use at non-tesla EVSE.CCS- (Combined Charging System) is a EV Charger port protocol. It has been adopted by most vehicle manufacturers (BMW, Ford, Jaguar, GM, etc.). It should also be noted that since 2014, the European Union has required the provision of Type 2 (CCS-Combo 2) within its EVSE network. Tesla has historically used a proprietary connector; however, the European Union standardization has let Tesla to integrate the CCS2 charge port into vehicles sold there.



Appendix F: EV Charging Location Categories

F.1 Home/Work/Fleet/Extended Stay:

The US Department of Energy estimates that over 80% of EVs are currently being charged at home or place of business (work). This is largely because of the convenience and cost of charging at these locations. Other locations such as public buildings, shopping centers and airports also bolster the opportunity for charging EVs.

Although most EV charging happens at home or work, a large area of opportunity for improvement is multi-tenant housing. Higher density residential new construction is rapidly growing in response to Utah's population growth, housing availability, and socioeconomic dynamics.

As a first step, changes in building codes can help ensure future construction is "EV Ready" by requiring the appropriate sizing of electrical equipment and installing electrical conduit necessary to provide power for future dedicated parking spaces. Additionally, continuing grant opportunities to help retrofit existing locations help provide EVSE to multi-tenant housing locations and improve the likelihood of EV adoption for their residents.

F.2 Urban DCFC:

These stations are located within urban areas. Initially, some are likely to be at government buildings, existing gas stations, shopping centers and other high-traffic areas that will see increased utilization early in the EV adoption process. These locations are important for individuals without access to workplace or home charging.

F.3 EV Mobility Network DCFC:

These stations are intended to reduce range anxiety for current and potential EV owners. DCFC stations also support fleet conversions (government and private). A well-planned EV mobility DCFC network will encourage ecotourism from out-of-state EV owners/visitors.

This document and planning effort are focused on this group primarily out of the need to coordinate their development in a methodical and pragmatic way. Many of the urban areas have opportunities for EVSE implementation by private entities and government places of business.

EVSE implementations outside of the major urban areas provide functional travel opportunities for EV owners (individuals and fleets). Non-urban DCFC is least likely to privatize initially, and the state of Utah intends to pursue innovative public-private partnerships during each round of EVSE funding. The State's strategic goal is to support accelerated EV adoption by providing access to EVSE on Utah's key corridors via public investments and public-private partnerships until the private sector enters the market to continue building out the Plan.

Appendix G: Energy Service Providers

G.1 Energy Service Providers (ESP) and Utility Infrastructure

While selecting sites for EV installation, ESP service territories will need to be considered. Early and continuous engagement with ESPs is critical in planning EVSE locations. EVSE, particularly DCFC, may strain the utility grid and mitigation efforts should be considered. ESPs are a critical partner in the development of a statewide DCFC network.

ESPs are also an important partner to help address expensive and ongoing operating costs, particularly the demand component of the utility bill. EVSE implementers are encouraged to work with ESPs to help determine the most balanced rate schedules as the need for an economic and fair solution continues to grow. Energy storage solutions may be deployed to help mitigate operational costs, grid loading, or when line extensions to bring 3-phase/480Volt electricity to the site are not feasible.

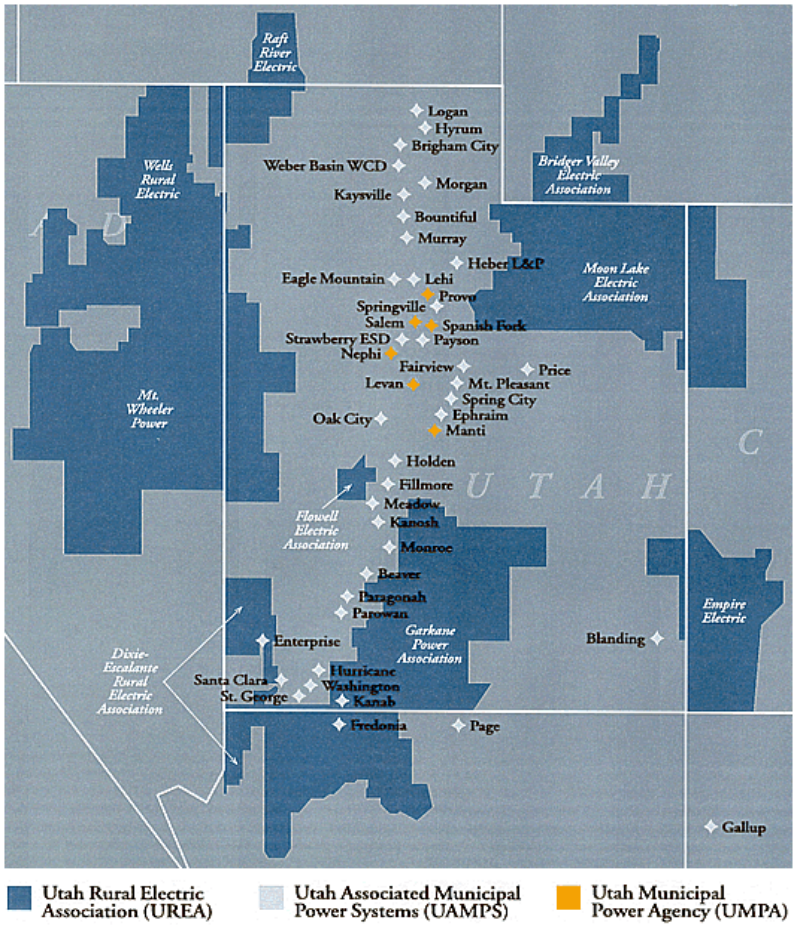


Figure 3: https://dpu.utah.gov/map.html

G.1.1 Rocky Mountain Power (RMP)

Rocky Mountain Power is Utah's largest electrical energy supplier. Besides its direct customers, RMP also provides energy to other ESPs around the western US.

"Rocky Mountain Power, a division of PacifiCorp, is an energy company based in Salt Lake City, Utah. The business efficiently delivers reliable, affordable, safe and environmentally responsible energy to more than 1.1 million customers in Utah, Wyoming and Idaho. The company supplies customers with electricity from a diverse portfolio of generating plants including hydroelectric, natural gas, coal, wind, geothermal and solar resources."

In the interest of interstate connectivity, and the potential to create EVSE partnerships outside the State of Utah that benefit the citizens of Utah, the service map of Rocky Mountain Power to all surrounding areas is provided.

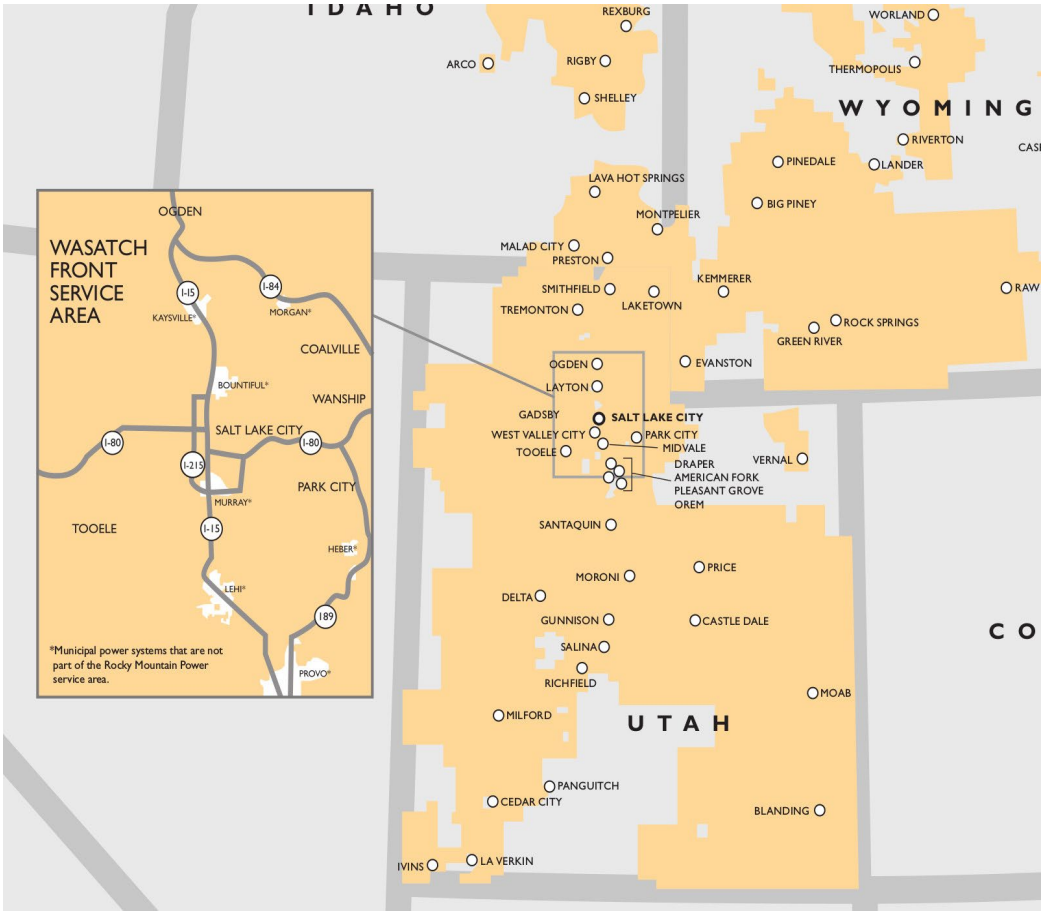


Figure 4: Rocky Mountain Service Area Map. Source: "Service Area Map." Glossary of Electrical Terms, www.rockymountainpower.net/about/cf/sam.html.

G.1.2 Utah Associated Municipal Power Systems (UAMPS):

UAMPS is an organization that represents multiple municipal entities and utility service districts in the intermountain west. According to its website:

"*Utah Associated Municipal Power Systems (UAMPS) is a political subdivision of the State of Utah that provides comprehensive wholesale electric-energy, transmission, and other energy services, on a nonprofit basis, to community-owned power systems throughout the Intermountain West. UAMPS members are located in Utah, California, Idaho, Nevada, New Mexico and Wyoming.*"

G.1.3 Utah Rural Electric Cooperative Association (URECA):

URECA includes eleven (11) electric cooperatives that operate and provide power around the state of Utah and adjoining states. Some members include Wells Rural Electric Coop, Garkane Energy, Empire Electric, etc. According to its website:

"URECA exists to provide leadership, advocacy and support to unify and empower Utah's consumer-owned electric co-ops."

G.1.4 Utah Municipal Power Agency (UMPA):

UMPA is an organization that represents the electrical services of the municipalities of Levan, Manti, Nephi, Provo, Salem, and Spanish Fork. According to its website:

"To develop a reliable and economical power supply program to meet the electric power and energy needs as required by the members and their customers."

Appendix H: Report Terminology/Definitions

H.1: Transportation and Traffic

Mile Post (MP):

Mile Posts are a roadside marker indicating the linear location along a given corridor. Highway mile posts start with zero (0) at the southern or western state border and increase heading north or east respectively. Mile Posts are also used to identify highway exits and other signage along corridors.

Annual Average Daily Traffic (AADT):

AADT is a measure used primarily in transportation planning and transportation engineering. Traditionally, it is the total volume of vehicle traffic of highway or road for a year divided by 365 days. AADT is a simple, but useful, measurement of how busy the road is.

Vehicle Miles Traveled (VMT):

A measure of the amount of travel for all vehicles in a geographic region over a given period of time, typically a one-year period. It is calculated as the sum of the number of miles traveled by each vehicle. VMT provides a measure of total travel, how travel changes over time, and differences in travel among regions and states. It can be used as a measure of personal and commercial vehicle demand. While not the sole measure of travel demand, VMT can help identify the regions that are traveled more frequently and contribute to producing more traffic congestion.

Peak Hour Volume:

The volume of traffic that uses the approach, lane, or group of lanes in question, during the hour of the day that observes the highest traffic volumes. This may be a useful measure in helping estimate EVSE demand during peak travel periods.

Queue:

Queue is the number of vehicles being delayed due to demand exceeding capacity of a design feature. This could be at stop lights, on-ramps, or in this case of this report, waiting for access to EVSE.

H.2: Vehicle Terminology

Light Duty Vehicle (LDV):

Light Duty Vehicles are defined by the US-EPA as vehicles with a maximum gross vehicle weight rating (GVWR) of less than 8,500 lbs. This accounts for most typical passenger vehicles/cars.

Vehicle Drive Systems:

- ***Internal Combustion Engine (ICE)***, a vehicle that burns fuel to drive a piston or rotary type engine.
- ***Hybrid Electric Vehicle (HEV)***, a vehicle that is powered by an internal combustion engine in combination with one or more electric motors that use energy stored in batteries.
- ***Plug-In Hybrid Electric Vehicle (PHEV)***, a hybrid electric vehicle that has the additional ability to charge the battery through charging equipment (EVSE).
- ***Electric Vehicle (EV)***, a vehicle that uses a battery pack to store electrical energy that powers an electric motor. EVs are charged using charging equipment (EVSE).
- ***Fuel Cell Electric Vehicle (FCEV)***, a vehicle that use stored hydrogen to generate electricity, via a fuel cell, to drive one or more electric motors.
- ***Alternative Fuel Vehicle (AFV),*** a vehicle that operates on substances other than traditional/conventional petroleum gas and diesel.
- ***Zero-Emissions Vehicle (ZEV)***, a vehicle that never emits exhaust gas from the onboard source of power.

EV Charging Equipment:

- ***AC and DC Power***, Alternating Current (AC) is a type of electrical current in which the direction of the flow of electrons switches back and forth at regular intervals or cycles. Direct Current (DC) is electrical current in which electrons only flow one way. Energy storage is DC power and is measured in Kilowatt-Hours (kWh).
- ***Electric Vehicle Supply Equipment (EVSE)***, electric vehicle supply equipment also called, electric vehicle charging station, EV charging station, electric recharging point, charging point, charge point, electronic charging station (ECS), is an element in an infrastructure that supplies electric energy for the recharging of plug-in electric vehicles—including electric cars, neighborhood electric vehicles and plug-in hybrids. EVSE is the electrical and EV trade terminology for EV chargers. EVSE is defined in Article 625 of the National Electric Code (NEC).
- ***Level I Charging***, low powered EVSE that operates on 120 Volt Alternating Current. Level I chargers use the vehicles onboard charger to convert the AC to DC power stored by the battery.
- ***Level II Charging***, mid-tier EVSE that is typically found at work, fleet, home or other long term parking locations. Level II chargers operate on either 240V (typically residential) or 208V (typically businesses, offices) power sources. The vehicles onboard charger converts the AC to DC power stored by the battery.
- ***Level III, Direct Current Fast Charger (DCFC)***, EVSE that is powered by high voltage sources that convert AC power to DC power in the unit and send energy directly to the vehicle battery.

  - *Fast DC* chargers typically have a power output range of up to 150kW.
  - Ultra Fast DC chargers have power output of over 150kW and currently up to 350kw.
  - The vehicle battery chemistry is the limiting factor.
  - Batteries are typically designed to accept their full design charging power up to approximately 80% state of charge, then taper the charging power for the final 20%.
  - Often, EV owners will fast charge to 80% at public chargers to speed mobility and then provide a full charge at home or work Level II chargers.
- ***Battery Exchange Station****,* a fully automated facility that will enable an electric vehicle with a swappable battery to enter a drive lane and exchange the depleted battery with a fully charged battery through a fully automated process.

- ***EVSE Connector Types:***
  - ***Combined Charge System (CCS1)***, One of two current United States plug standards for fast DC.
  - ***CHAdeMO***, an EVSE plug type, typically found on some Asian brands of vehicles such as older Nissan Leaf, Mitsubishi, etc. The industry is moving away from this standard and towards the CCS1 plugs. (Note: European Union has standardized on the CCS2 since 2017, as a result, new Tesla vehicles sold in Europe are designed with the CCS2).
  - ***J-1772****,* also known as a J-Plug, is a type of connector that is present on all models of EVs. This connector is the standard for level I/II charging.
- ***Grid-to-vehicle (G2V),*** Grid-to-vehicle-technology enables vehicles to charge at varying capacities, depending on energy availability. Electric vehicle batteries can be charged in a smart way to prevent peak loads on the grid. This can be based on energy demand and available capacity on a local level. The vehicle to grid technology determines when, and at which capacity, the vehicle will be charged.
- ***Vehicle-to-grid (V2G),*** Vehicle-to-grid-technology enables vehicles to feed electricity back into the grid. The battery in the vehicle can be used as a buffer to store energy in times of high (sustainable) energy production, but also to act as an energy supplier in times of low (sustainable) energy production. Vehicle-to-grid technology contributes to optimizing sustainable energy usage.

H.3: Miscellaneous:

- ***Public Private Partnership (PPP)***, Public-Private Partnerships involve collaboration between a government agency and a private-sector company that can be used to finance, construct, and operate projects, such as public transportation projects and services.
- ***Request for Information (RFI)***, a common business process whose purpose is to collect written information about the capabilities of various suppliers. Normally RFIs are structured to allow for side-by-side comparisons to help evaluate offerings. RFIs are a useful tool to

gather an overview of the current state of practice in each field or service. This information is often tabulated, evaluated, and used as a reference when developing any subsequent Request for Proposal(s).

- ***Request for Proposals (RFP)***, is a business document that announces a project, describes it, and solicits bids from qualified contractors to complete it.

Appendix J: Useful Links

In addition to resources found in the State of Utah EV Master Plan V2.0, the below links are some of the current links used as references during the development of this report. It is important to recognize that the EV and EVSE industries are continually evolving, and additional web searches should be used to identify the latest information available.

Utah Links:

Utah EV Master Plan, V2.0:

- https://das.utah.gov/wp-content/uploads/State-of-Utah-EV-Master-Plan_Version2_FINAL-1.pdf

Utah HB 259 (2020)/Utah Code 72-1-216S

- https://le.utah.gov/xcode/Title72/Chapter1/72-1-S216.html?v=C72-1-S216_2021050520210701

Utah HB 396 (2020)/Utah Code 54-4-41

- https://le.utah.gov/xcode/Title54/Chapter4/54-4-S41.html?v=C54-4-S41_2021050520210701

Utah DAQ Workplace Grant

- https://deq.utah.gov/air-quality/workplace-electric-vehicle-charging-funding-assistance-program

Rocky Mountain Power EVSE Grant

- https://www.rockymountainpower.net/savings-energy-choices/electric-vehicles/utah-incentives.html

REV-West

- https://www.naseo.org/issues/transportation/rev-west

EVSE Codes Resources:

Southwest Energy Efficiency Project

- https://www.swenergy.org/transportation/electric-vehicles/building-codes

Salt Lake City Off Street Parking

- https://www.slc.gov/planning/wp-content/uploads/sites/13/2019/05/Parking-Chapter-Final-Draft.pdf

EV and EVSE Links:

Plug Share (Crowd sourced EVSE locator)

- https://www.plugshare.com/

US Department of Energy, Alternative Fuels Data Center

- https://afdc.energy.gov/

Advanced Clean Technology-News

- https://www.act-news.com/

Rocky Mountain Power
Exhibit RMP___(JAC-5)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of James A. Campbell

USU Analysis

August 2021

UtahStateUniversity

ASPIRE
NSF Engineering Research Center

MEMO

To: Rocky Mountain Power

From: Utah State University / ASPIRE Engineering Research Center

Date: December 29, 2020

Subject: Utah EV Adoption Forecast and DC Fast Charger Utilization

Executive Summary

This report provides adoption forecasts for electric vehicles (EVs) in Utah resulting from Rocky Mountain Power programs and provides estimates for the demand, utilization, and revenue from public DC fast charging (DCFC).

In Utah, vehicles travel approximately 30 billion miles per year, with roughly 72% in urban and 28% in rural regions. Today, Utah has roughly 3 million total registered vehicles, with 1.28 million light duty passenger, 1.23 million SUVs and light trucks, and 87,000 heavy trucks.

In this report, it is estimated that by 2030 with a medium adoption curve, there will be an estimated 180,000 electric vehicles registered in Utah with an estimated total annual EV charging demand of 700 million kWh. It is further estimated that by 2030 the total demand for public DC fast charging (DCFC) will reach 140 million kWh, requiring approximately 100 DCFC locations with multiple charging plugs at a combined 700 kW peak power rating to meet the demand. Utilization levels of DCFC locations are expected to reach approximately 30% or higher by 2030, resulting in an annual revenue per station of roughly $230,000. Adoption levels and revenues are expected to be lower prior to 2030 during the early adoption years. Early investment in DCFC infrastructure at the levels shown through 2030 will be essential to reach the adoption levels predicted that will sustain the high levels of utilization and average revenue estimated per DCFC location.

Electric Vehicle Adoption Forecast

Dr. Ziqi Song at USU provided a forecast estimate for light duty electric vehicle (EV) adoption in Utah as part of the final report for the WestSmartEV project. The forecast included standard passenger vehicles and light-duty trucks (weighted 6,000 lbs or less, which include SUVs and pick-up trucks) in Utah. The forecast used the Bass model defined as:

$$F(t) = M\frac{1 - e^{-(p+q)t}}{1 + (q/p)e^{-(p+q)t}}$$

Where:

$F(t)$: cumulative adoption by time t

M: market potential, need to be estimated in advance

p: coefficient of innovation

q: coefficient of imitation

The coefficients p and q were calibrated by the historical EV adoption data collected from the Alliance of Automobile Manufacturers (AAM) and Utah DMV for passenger vehicles, and similar adoption patterns were assumed for light-duty trucks and SUVs. Three scenarios were considered: a low estimate with an EV market potential of 30%, a medium estimate with an EV market potential of 45%, and a high estimate with an EV market potential of 60%.

In this report, the adoption model is further modified to include adoption of heavy duty trucks and to include the growth rate in total vehicles. Heavy duty trucks were added starting with State of Utah motor vehicle statistics [State] and then applying similar adoption patterns as developed for light duty, but with a six year delay in adoption due to delayed availability of heavy duty vehicles. The growth rate was added by assuming vehicle growth rate tracks population growth rate, and population growth rates per year were applied according to the estimates from the Gardner Policy Institute projections [Table 5, Gardner]. The resulting updated adoption model results for predicted total combined light and heavy duty EVs in Utah are depicted in Figure 1 and summarized for 2026 and 2031 in Table 1. For example, by 2031 with the medium adoption curve, there will be an estimated 230,000 electric vehicles registered in Utah.

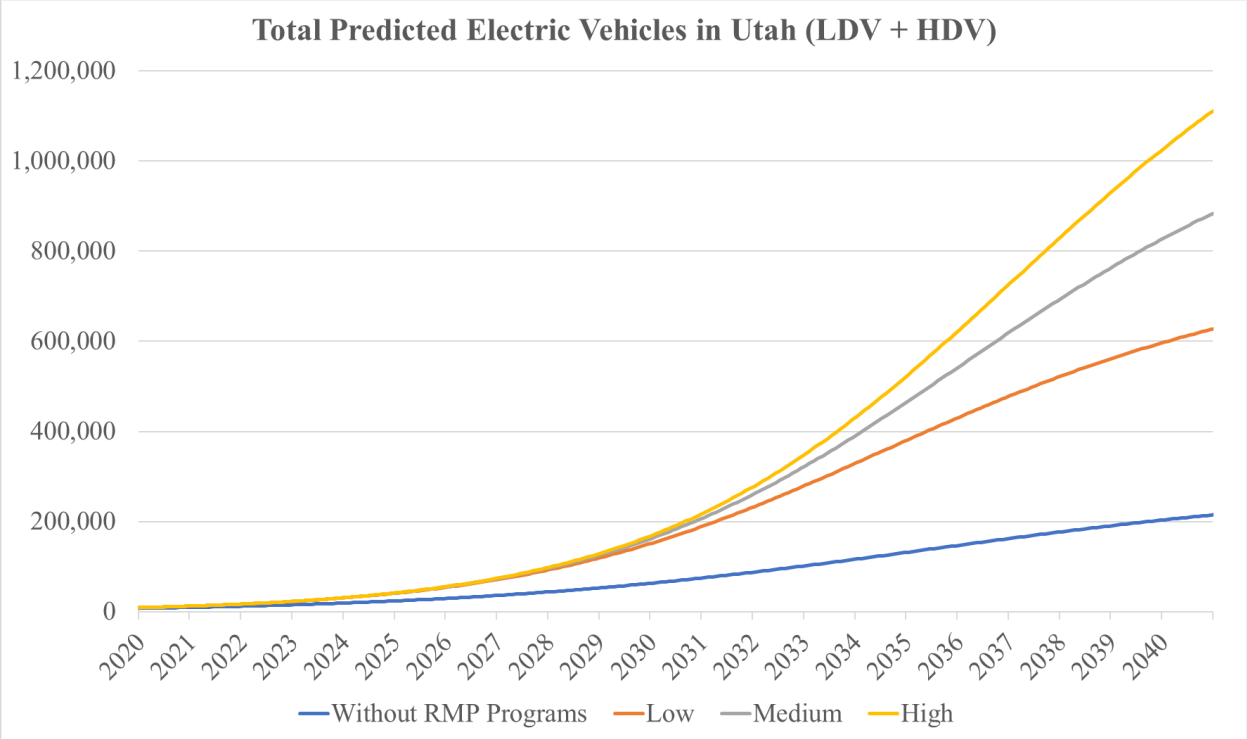


Figure 1. Plot of total predicted EVs in Utah (combined light to heavy duty) for low, medium and high adoption scenarios.

Table 1. Total predicted EVs in Utah (combined light to heavy duty) in 2026 and 2031.

	W/out RMP	Low	Medium	High
2026	32,000	61,000	63,000	63,000
2031	80,000	208,000	230,000	243,000

Charging Demand and Charger Utilization Forecast

The total charging demand for EVs in Utah was estimated by assuming the following averages for vehicle energy usage and miles driven. The impacts of EVs from Utah charging while out of state and of EVs from out of state charging while in Utah were neglected. It is expected that these impacts would result in higher demand than predicted due to the high levels of tourism and freight in Utah from out of state.

Table 2. Assumptions for EV energy consumption and miles traveled per year in Utah.

Average light duty vehicle kWh per mile	3
Average light duty vehicle miles per year	10,000
Average heavy duty vehicle kWh per mile	0.5
Average heavy duty vehicle miles per year	50,000

The total charging demand was calculated based on the total vehicles predicted in Figure 1 and the vehicle consumption information from Table 2. The resulting forecast for the total charging demand for EVs in Utah is depicted in Figure 2 and summarized for 2026 and 2031 in Table 3. For example, by 2031 with the medium adoption curve, the estimated total annual EV charging demand in Utah will reach 882 million kWh.

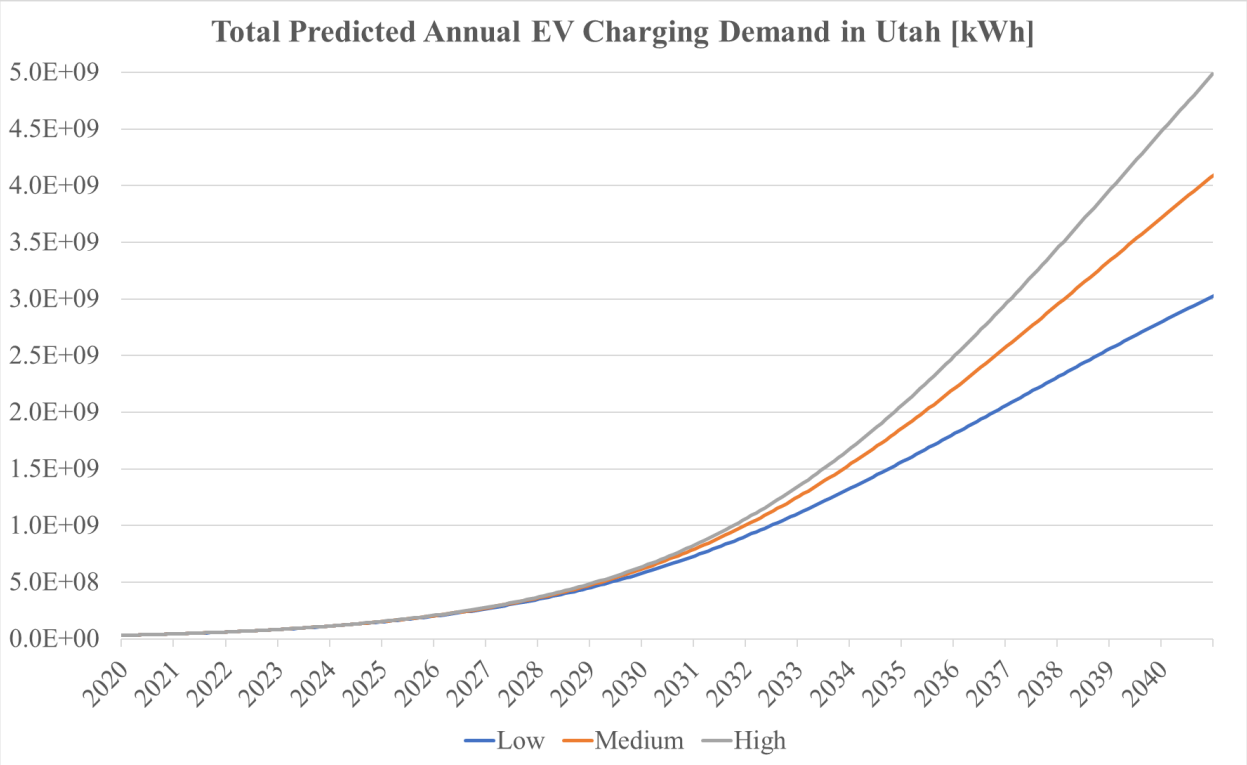


Figure 2. Total predicted annual charging demand in kWh for EVs in Utah (combined light to heavy duty, all charging from level 1 home charging to public DC fast charging).

Table 3. Total predicted annual charging demand in kWh for EVs in Utah in 2025 and 2030 (combined light to heavy duty, all charging levels from level 1 home charging to public DC fast charging).

	Low	Medium	High
2026	230,000,000	235,000,000	237,000,000
2031	807,000,000	882,000,000	926,000,000

The forecast total demand for DC fast charging in Utah was predicted by estimating the percentage of EV charging that will utilize DC fast charging. This estimate was based on the McKinsey study [McKinsey], showing significant growth in the need for public and fast charging at higher adoption levels, particularly in more urbanized regions, to accommodate vehicle owners without private parking at home or work and scenarios where vehicles are operated more continuously throughout the day (e.g. fleet, taxi, Uber/Lyft).

The resulting forecast for EV DC fast charging demand in kWh in Utah is depicted in Figure 3 and summarized in Table 4 for 2026 and 2031. For example, the estimated total annual demand in Utah for DCFC in 2031 with the medium adoption curve is 191 million kWh (i.e., 191,000 MWh).

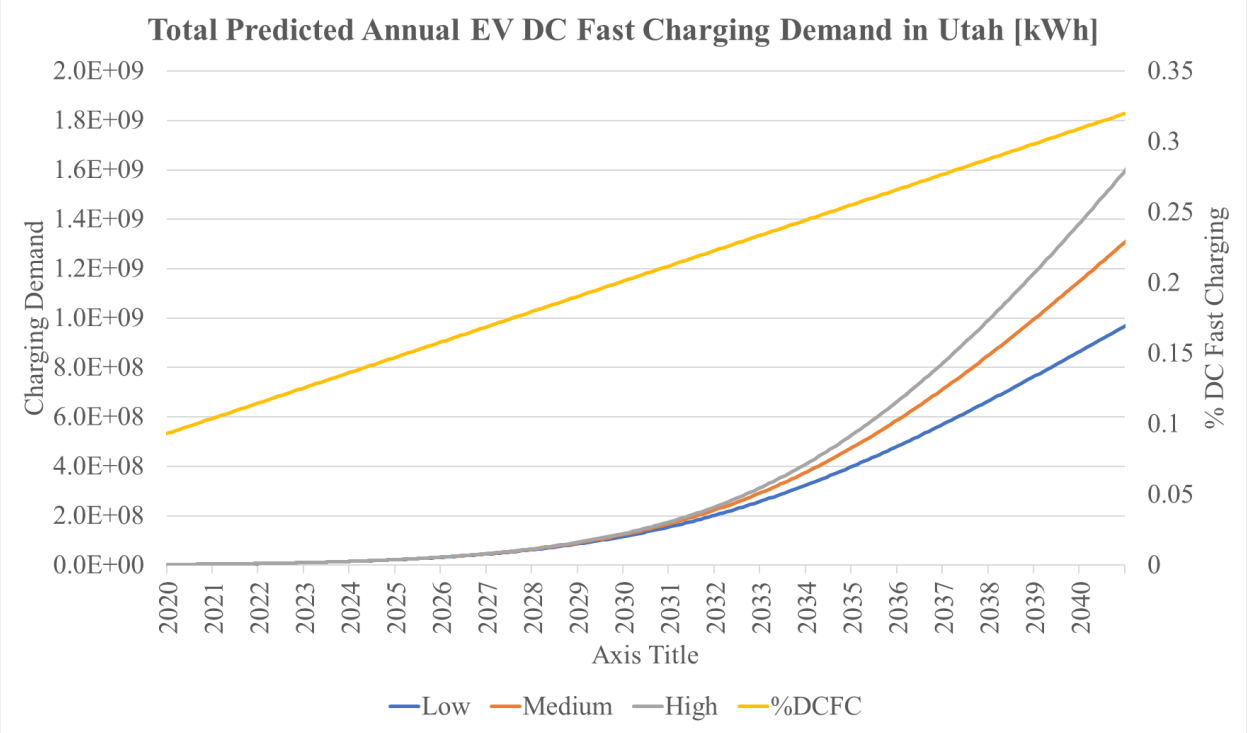


Figure 3: Total predicted annual DC Fast Charging demand in kWh for EVs in Utah

Table 4. Total predicted annual DC Fast Charging demand in kWh for EVs in Utah by 2025 and 2030.

	Low	Medium	High	% DCFC
2026	375,000,000	382,000,000	386,000,000	16.3%
2031	175,000,000	191,000,000	201,000,000	21.7%

The number of DC Fast Charging (DCFC) locations needed in Utah to support charging demand was estimated by considering a fixed 20% utilization target (e.g. 9.6 hours per day at 50% rated power) and a fixed charging site peak power rating of 700 kW. Such a DCFC station may include, for example, multiple plugs capable of 50 kW to 350 kW and a total site power limit of 700 kW. Some sites may offer higher power and others lower power, where 700 kW was considered a reasonable estimate for the average peak power of DCFC needs. At this utilization and peak power rating, each charging station is assumed to deliver on average 3,360 kWh per day, or 1,226 million kWh per year. The estimated total annual DCFC demand in Utah was then divided by the average energy delivered by each DCFC location to estimate the number of DCFCs needed to meet the demand. The results are depicted in Figure 4 and summarized in Table 5 for 2026 and 2031. For example, it is estimated that 156 DCFC locations with 700 kW peak power each will be needed in Utah by 2031 with the medium adoption curve. Or, instead of considering by location, the estimate can be converted to the total rated DCFC plugs needed by multiplying the estimate by the ratio of the site power to the plug power. For example, at 50 kW rating per DCFC plug, the total number of 50 kW plugs needed by 2031 for the medium adoption curve would be 2,184 plugs.

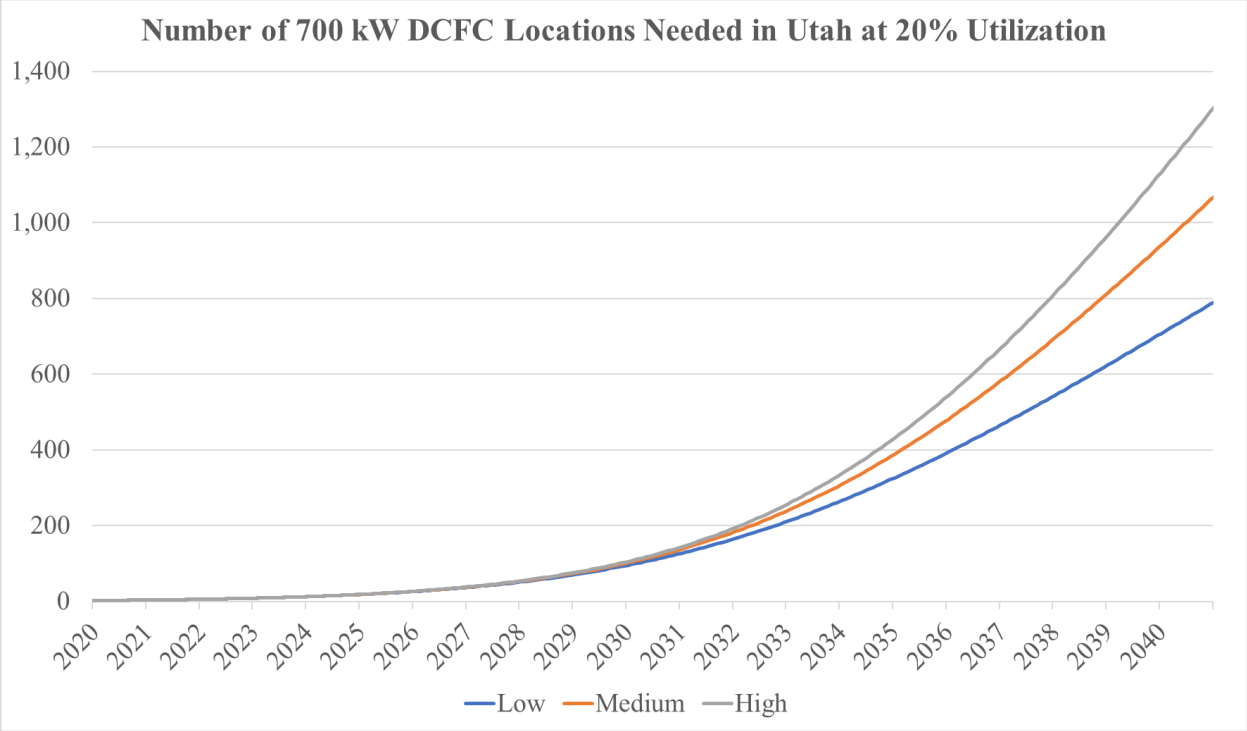


Figure 4. Number of 700 kW DCFC locations needed in Utah at 20% utilization.

Table 5. Number of 700 kW DCFC locations needed in Utah at 20% utilization.

	Low	Medium	High
2026	30.6	31.2	31.5
2031	143	156	164

While the results from Figure 4 and Table 5 consider the number of charging locations needed to maintain a fixed 20% utilization, another approach is to consider the expected utilization for a given incremental deployment of DCFC locations. This approach provides a more accurate estimate on the anticipated level of utilization of charging locations during the early years of adoption. Results are depicted in Figure 5 and Table 6 for a scenario with 20 locations starting in 2020, an additional 20 locations in 2025, and additional increments of 20 locations as indicated to keep the utilization level around 30% to 40%. For example, in 2031 with the medium adoption curve, and 100 charging locations with 700 kW power rating, the utilization per location is estimated to average 31.2%.

Utilization levels above 30% may be possible with smart charge management solutions to maintain quality of service and avoid waiting time and reduced charging rates to EV operators. Without smart charge management solutions, additional DCFC locations or higher site power ratings would be needed for the medium and high adoption curves.

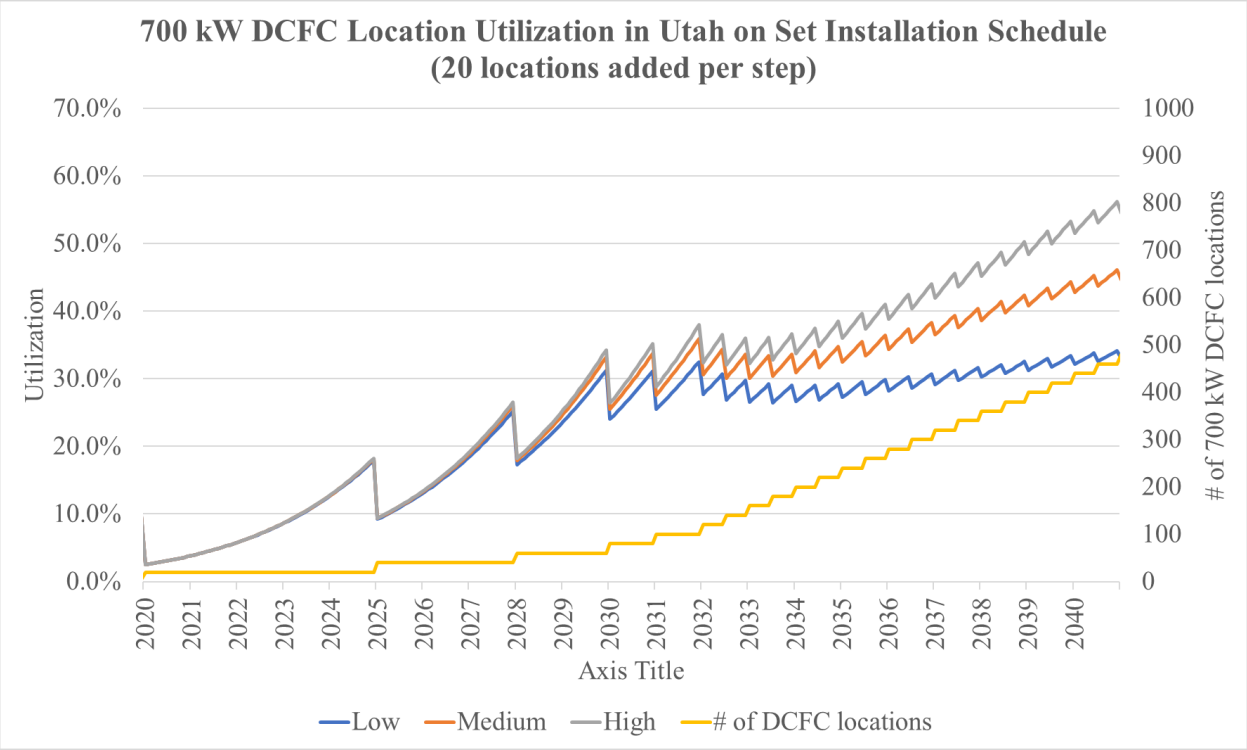


Figure 5: Utilization of 700 kW DCFC locations in Utah for the specified number of locations each year.

Table 6. Utilization of 700 kW DCFC locations in Utah for the specified number of locations each year.

	Low	Medium	High
2026: 40 locations	15.3%	15.6%	15.7%
2031: 100 locations	28.5%	31.2%	32.7%

Charging Station Revenue Forecast

Charging station revenue can be estimated by calculating the revenue as a function of utilization and anticipated rates per kWh and per session, then applying the revenue per year to the appropriate curve in each year from Figure 5 (or a modified figure according to the scheduled number of DCFC locations deployed in each year).

The anticipated billing rates for use of the DCFC locations were assumed as follows:

- **Billing price per kWh: $0.15**
- **Billing price per session: $1.00**
  - Assumed one session per utilized hour of charging (rounded up)
- **Energy cost per kWh: $0.03**

The resulting estimated annual revenue per station is shown in Table 7 for utilization from 10% to 40%. For example, at 30% utilization, the annual revenue per station is estimated to be $232,432. As shown in Figure 5, these revenue rates are expected to be sustained after approximately 2030, whereas the revenue rates will be lower before 2030 during the early adoption years. Investment in infrastructure at the levels indicated is critical in these early years despite reduced annual revenue to support adoption growth and reach the turning point around 2030 where sustained high utilization and average revenue per station is achieved.

Table 7. Annual Revenue per 700 kW DCFC station location

Annual Revenue per 700 kW DCFC station location				
Utilization (LF)	***kWh / year***	***# Sessions / year***	***Energy Cost ($)***	***Annual Rev Price@ $0.15***
10%	613,200	4,380	$18,396	$77,964
15%	919,800	5,840	$27,594	$116,216
20%	1,226,400	7,300	$36,792	$154,468
25%	1,533,000	8,760	$45,990	$192,720
30%	1,839,600	11,680	$55,188	$232,432
35%	2,146,200	13,140	$64,386	$270,684
40%	2,452,800	14,600	$73,584	$308,936

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Rocky Mountain Power
Exhibit RMP___(JAC-6)
Docket No. 20-035-34
Witness: James A. Campbell

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of James A. Campbell

Emission Factor

August 2021

PacifiCorp System Emissions and Renewable Energy Landscape: Information on Greenhouse Gas and Renewables Reporting

Background: Forecasting Energy Resource Needs for Six States

Every two years PacifiCorp is required to forecast the energy resources needed to meet the electric loads of PacifiCorp's customers in the six states it serves on a 20 year horizon. This forecast is available in a publically-available document called the Integrated Resource Plan (IRP). The IRP is a comprehensive decision support tool and roadmap for meeting the company's objective of providing reliable and least-cost electric service to PacifiCorp's customers throughout Oregon, Washington, California, Wyoming, Idaho and Utah.

PacifiCorp's Six-State Service Territory

The IRP is developed through a robust public process with input from state utility commission staff, state agencies, consumer, environmental and industry advocacy groups, project developers, and other stakeholders. The IRP uses system modeling tools as part of its analytical framework to determine the long-run economic and operational performance of alternative resource portfolios. These models simulate the integration of new resource alternatives with our existing assets, thereby informing the selection of a preferred portfolio judged to be the most cost-effective resource mix after considering risk, supply reliability, uncertainty, and government energy resource policies. While the IRP reflects the best available forecast, many factors ultimately drive PacifiCorp's resource selection. Gas prices and hydroelectric power variability are leading drivers of fuel mix and emissions, and changes in these factors can cause significant deviations in actuals versus the forecast. While PacifiCorp is confident in its trend toward significant renewables additions and emissions reductions, year-to-year actuals can fluctuate considerably.

Emissions

PacifiCorp has made significant strides in reducing its system emissions, at a 13% reduction measured from a 2005 baseline as of April 2020. These were driven by significant changes to the fuel mix to date, including the addition of over 3,000 MW of owned and contracted renewable capacity since 2007. Additionally PacifiCorp engaged with customers in innovative solutions that enabled over 800 MW of customer-directed wind and solar projects through their partnership in PacifiCorp's Blue Sky Select voluntary renewable program.

Every year in June PacifiCorp reports the previous years' emissions and emissions factor, measured in tons of carbon dioxide equivalent per Megawatt-hour (CO_2e/MWh).[1] Carbon dioxide equivalent is a unit that includes calculated GHG emissions from methane (CH_4) and nitrous oxide (N_2O). The following emissions factor represents emissions across PacifiCorp's six-state system and is appropriate for use in most GHG reporting protocols.

PacifiCorp System-Wide Emissions (2018)

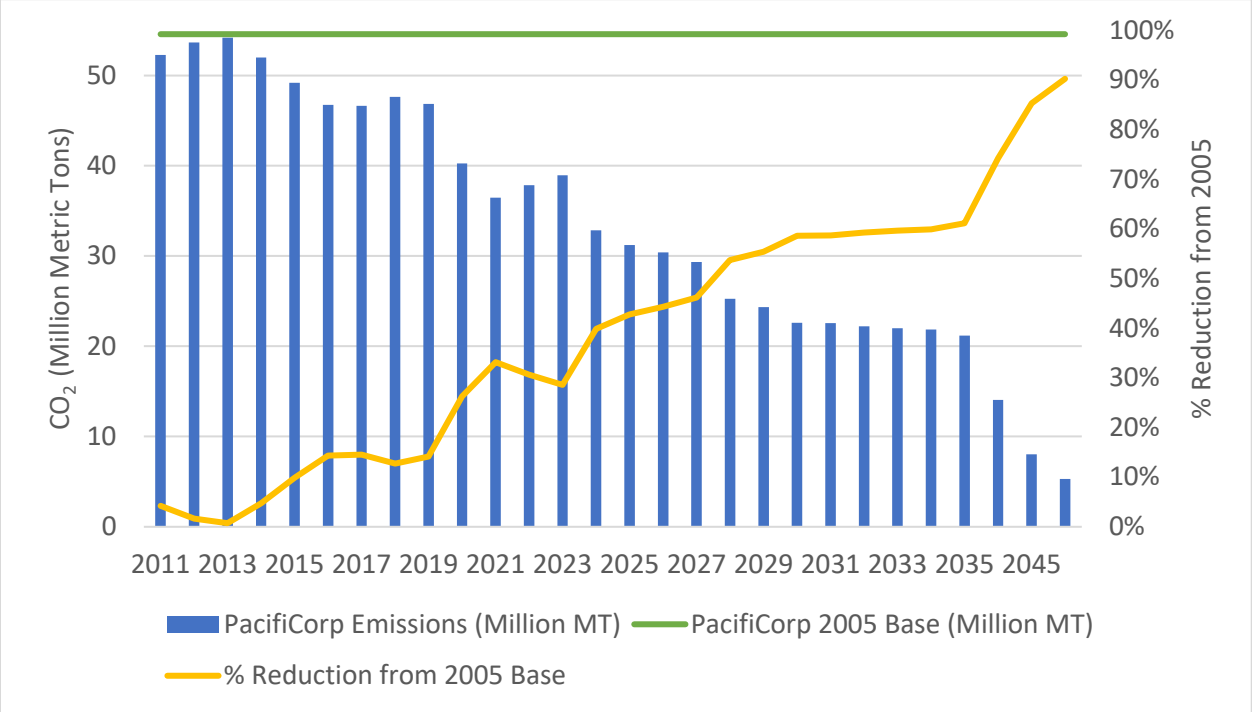
PacifiCorp 2005 System Emissions (Million MT CO_2e)	54.6
PacifiCorp 2018 System Emissions (Million MT CO_2e)	47.7
PacifiCorp 2018 System Emission Intensity (MT CO_2e / MWh)	0.68
Reduction from 2005 Base	13%

Emissions and Fuel Mix Projections[2]

Based on the IRP's projected changes to PacifiCorp's fuel mix, PacifiCorp forecasts that emissions will reduce drastically over the planning period – amounting to an 80% reduction in 2045 from a 2005 baseline. This is driven by significant changes to our fuel mix, most notably the addition of over 7,000 MW of new renewables: 3,500 MW of new wind generation by 2025 and a total of 4,600 MW of new wind generation by 2038; and 3,000 MW of new solar by 2025 and 6,300 MW by 2038. In the near term, by the end of 2020, we will see the emissions effects of PacifiCorp's EV2020 project, a $3 billion investment into 1,150 MW of new wind and 999 MW of upgraded or "repowered" wind. Emissions forecasts also reflect the planned retirement of 16 of 24 coal units by 2030, and additional 4 units by 2038. Additionally, the IRP calls for large-scale investment in battery storage, amounting to 600 MW of battery storage by 2025 and 2,800 MW by 2038.

[1] All actual emissions data is calculated in accordance with California Air Resources Board (CARB) methodology, reported annually, and third-party verified. The verification occurs by August.
[2] The forecasts below reflect emissions assigned to the six-state system. Customers in Oregon and Washington, due to state policy, will be allocated different emissions. For example, in 2030, emissions from coal resources will no longer be assigned to Oregon customers, as Oregon customers will not pay for those resources in their rates. See corollary documents for Oregon and Washington customers.

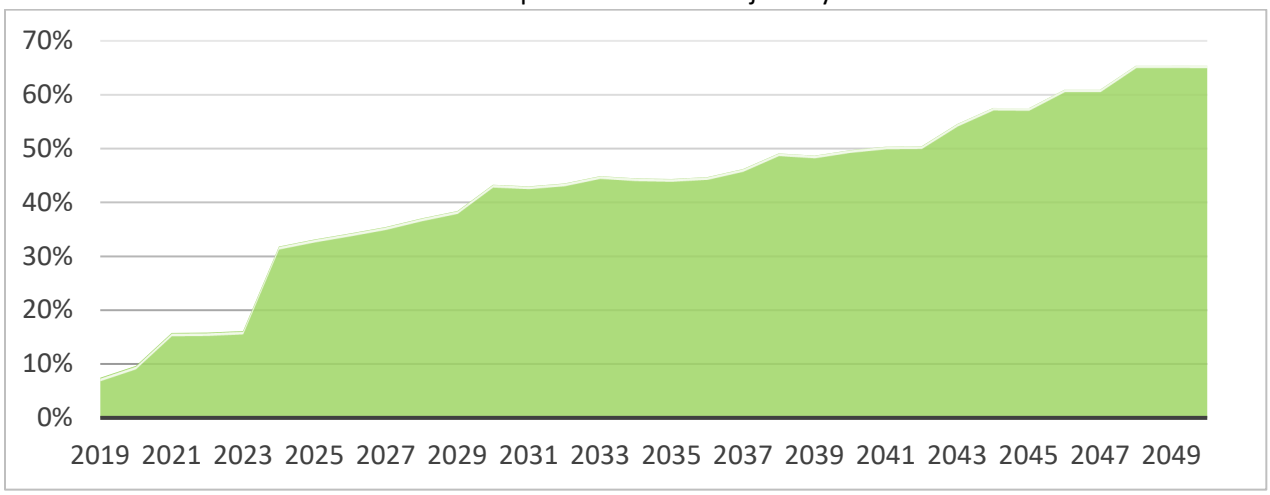
PacifiCorp System CO_2 Emissions Trajectory



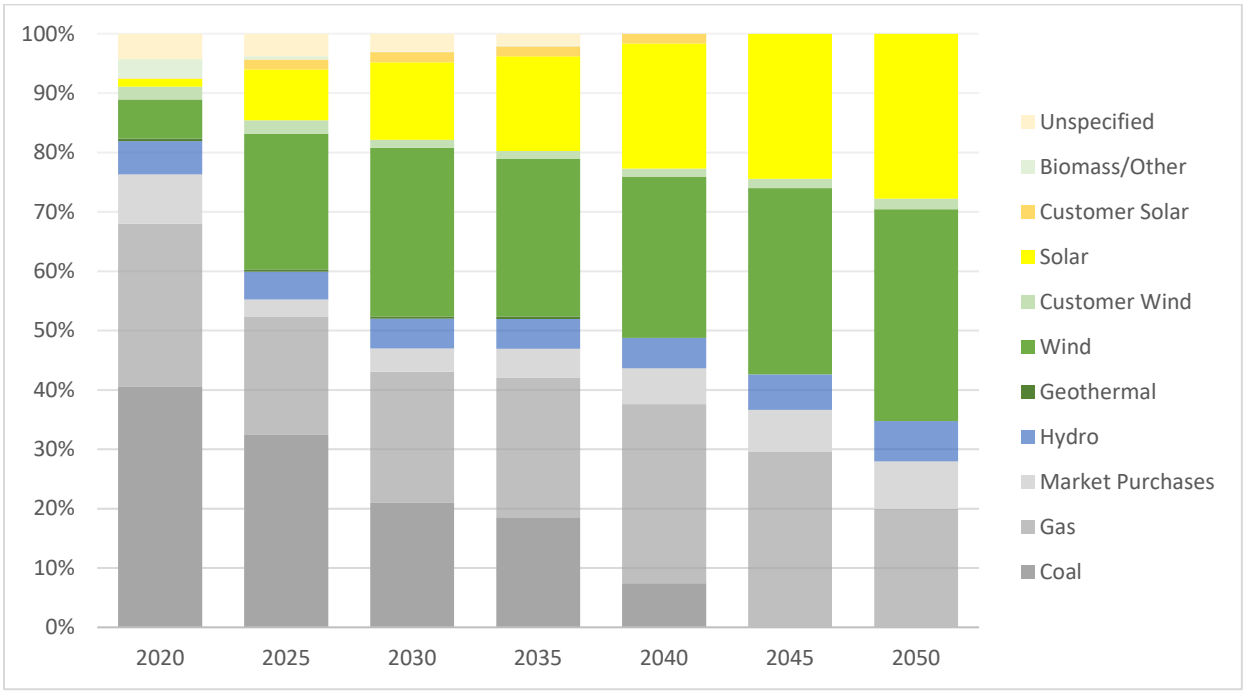
	2020	2025	2030	2035	2040	2045	2050
PacifiCorp Emissions (Million MT CO_2[3])	0.62	0.48	0.36	0.34	0.23	0.15	0.12
% Reduction from 2005 Base	26%	43%	59%	61%	74%	85%	90%
Emission Intensity (MT CO_2e / MWh)	0.56	0.44	0.33	0.31	0.21	0.14	0.11

[3] Forecasts are not available in CO_2e because current IRP modeling does not model emissions from CH_4 and N_2O.

PacifiCorp's Renewables Trajectory[4]



PacifiCorp Fuel Mix Forecast[5]



[4] Depending on different protocols for different reporting entities, definitions vary as to what fuels are considered "renewable." For example, the state of Utah recognizes nuclear power as "renewable" – as nuclear is a non-emitting resource. This chart includes low-impact hydropower resources, but other facilities (such as older and larger hydropower resources) may be considered renewable in some state policy and reporting protocols (they are excluded in this chart).

[5] In forecasted fuel mix, renewable resources without REC entitlement are classified as "unspecified," which is sometimes referred to as "null power." This applies to forecasted fuel mix only: in backward-looking actuals, the "unspecified" category refers to market purchases.

PacifiCorp Generation Forecast (GWh)[6]

	2020	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**
Coal	29,150	23,275	14,482	12,670	4,919	0	0
Gas	19,714	14,292	15,204	16,056	20,074	16,987	10,092
Market Purchases	5,954	2,021	2,715	3,374	4,000	4,023	4,018
Large Hydro	2,983	2,336	2,356	2,359	2,360	2,360	2,360
Low-Impact Hydro	974	940	975	976	975	975	975
Small Hydro	103	103	103	103	103	103	103
Geothermal	279	277	281	281	0	0	0
Wind	4,738	16,389	19,589	18,162	18,029	18,012	18,015
Customer Wind	1,557	1,617	917	891	896	896	896
Solar	940	6,151	9,011	10,935	14,028	14,017	14,017
Customer Solar	73	1,183	1,165	1,135	1,077	0	0
Biomass/Other	2,294	400	90	60	13	13	13
Unspecified	3,093	2,710	2,057	1,395	0	0	0
TOTAL	**71,853**	**71,693**	**68,943**	**68,396**	**66,474**	**57,386**	**50,489**
TOTAL RENEWABLE	**6,931**	**23,756**	**29,855**	**30,353**	**33,032**	**33,005**	**33,008**
TOTAL NON-EMITTING	**10,017**	**26,195**	**32,314**	**32,815**	**35,495**	**35,467**	**35,470**

[6] Generation numbers are reported using a REC-Based accounting methodology. See Appendix for more details.

Emissions Factor and Fuel Mix Forecast Methodology

Emissions and fuel mix forecasts that appear in this report based on the Preferred Portfolio published in PacifiCorp's 2019 Integrated Resource Plan (IRP).

Two forecasting models are utilized to determine the least-cost, least-risk portfolio of resources needed to meet projected system load: Planning and Risk (PaR) model, and System Optimizer (SO).[7] For the purpose of emissions and fuel mix forecasting, PaR is used because it more closely resembles actual system dispatch. While the SO model – which is reported in the IRP -- supplies a capacity view, PaR is able to bring the advantages of stochastic-driven risk metrics to the evaluation of the studies while also capturing additional operational considerations that the SO model does not asses (i.e., operating reserve requirements). PaR cost-risk metrics are ultimately used in the preferred portfolio selection, but as the IRP provides a forecast view of capacity needs, SO results are reported.

Importantly, the IRP-utilized PaR model provides the best available forecast for how resources will be dispatched -- but it is subject to changing conditions and assumptions and does not reflect all potential operational conditions. While the IRP reflects the best available forecast, many factors ultimately drive PacifiCorp's emissions intensity. Gas prices and hydroelectric power variability are leading drivers of emissions and changes in these factors can cause significant deviations in actuals versus the forecast. While PacifiCorp is confident in the overall greenhouse gas reduction trend reflected in the 20-year emissions forecast, year-to-year actuals can fluctuate considerably.

In addition, while the IRP calculates emissions associated with PacifiCorp-owned resources, it does not incorporate assumptions for market purchases. In addition, PacifiCorp's IRP is done on a six-state basis and does not allocate emissions to specific states or loads.

Methodology

- Emission intensity is calculated by dividing annual emissions by annual energy allocation, which in some years exceeds load. No assumptions are made regarding how the energy mix might be reduced to meet load.
- Coal is assumed to be displaced with an increase in proxy market generation.
- Proxy market generation values are assumed to be the difference between load and contribution of the remaining generating sources.
- CO_2 emissions for proxy market are calculated using California Air and Resources Board (CARB) default emission factor (0.428 MT CO_2e/MWh or 0.471 ST CO_2e/MWh).
- Other than market generation, emissions are currently reported in CO_2, not CO_2 equivalent.
- The IRP forecast is extended from 2039-2050 for emissions and fuel mix forecast purposes using four year rolling averages through the life of the resource or the end of a contract.
- For emissions calculations, generation is reported based on energy production (source-based accounting). Some portion of renewable attributes could be sold, transferred to PacifiCorp's customers, or not acquired with the energy. This is consistent with DEQ reporting requirements. However, for the fuel mix data in this document, renewable resources are reported based on REC-based accounting, in which PacifiCorp retains RECs from its own generation; or purchases

[7] For more information on the difference between the two models, please refer to page 182 of Volume I of the 2019 IRP document, available at https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf

energy and RECs from a counterparty. This does not include REC-only purchases for voluntary renewable programs.

- In forecasted fuel mix, renewable resources without REC entitlement are classified as "unspecified," which is sometimes referred to as "null power." This applies to forecasted fuel mix only: in backward-looking actuals, the "unspecified" category refers to market purchases.
- Coal plant retirement schedule is aligned with IRP assumptions.
- Although not reflected in this report, the company's inter-jurisdictional cost allocation methodology will continue to evolve, including changes to both long-term resource planning and cost allocation of resources to PacifiCorp's six states. These changes will further refine each state's allocation of portfolio emissions.
- "Renewable" resources in this document includes low-impact hydropower resources, and excludes older and larger hydropower resources despite some state policy considering these resources "renewable."
- "Customer owned renewables" refers to customer-directed wind and solar projects through their partnership in PacifiCorp's voluntary renewable program.

Rocky Mountain Power
Docket No. 20-035-34
Witness: Robert M. Meredith

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Direct Testimony of Robert M. Meredith

August 2021

Q. Please state your name, business address, and present position with PacifiCorp d/b/a Rocky Mountain Power ("PacifiCorp" or "Company").

A. My name is Robert M. Meredith. My business address is 825 NE Multnomah Street, Suite 2000, Portland, Oregon 97232. My present position is Director, Pricing and Cost of Service.

Qualifications

Q. Please describe your education and professional background.

A. I have a Bachelor of Science degree in Business Administration and a minor in Economics from Oregon State University. In addition to my formal education, I have attended various industry-related seminars. I have worked for the Company for 17 years in various roles of increasing responsibility in the Customer Service, Regulation, and Integrated Resource Planning departments. I have over 11 years of experience preparing cost of service and pricing analyses for all six states that PacifiCorp serves. In March 2016, I became Manager, Pricing and Cost of Service. In June 2019, I was promoted to my current position.

Q. What are your responsibilities?

A. I am responsible for regulated retail rates and cost of service analysis in the Company's six state service territory.

Q. Have you testified in previous regulatory proceedings?

A. Yes. I have previously filed testimony on behalf of the Company in regulatory proceedings in Utah, Oregon, Wyoming, Washington, Idaho, and California.

Purpose and Summary of Testimony

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to present the tariff and pricing for the Company's proposed Electric Service Schedule No. 60 – Company Operated Electric Vehicle Charging Station Service ("Schedule 60"). I also present the tariff and bill impacts from the Company's proposed Electric Service Schedule No. 198 –Electric Vehicle Infrastructure Program ("EVIP") Cost Adjustment ("Schedule 198"). Finally, I recommend a six-month extension of Electric Service Schedule No. 2E – Residential Service – Electric Vehicle Time-of-Use Pilot Option – Temporary ("Schedule 2E") and a ten-year extension of Electric Service Schedule No. 120 – Plug-in Electric Vehicle Incentive Program ("Schedule 120"), which will allow the incentives to continue for the duration of the EVIP. Proposed new and revised Schedules 60, 198, 2E and 120 are provided in Exhibit RMP___(RMM-1).

Q. Why is the Company proposing Schedules 60 and 198?

A. As described in Company witness Mr. James A. Campbell's direct testimony, Utah Code section 54-4-41 authorizes the Company to own and operate electric vehicle charging stations and to charge users for this service. Proposed Schedule 60 lists the prices and details for this service. Utah Code section 54-4-41 also authorizes the Company to recover from customers investments in electric vehicle charging infrastructure, which the Company proposes to accomplish through Schedule 198.

Schedule 60 – Company Operated Electric Vehicle Charging Station Service

Q. Please provide an overview of Schedule 60.

A. The Company designed Schedule 60 to provide service to any individual who uses Company operated electric vehicle charging stations for the purpose of recharging the battery of an electric vehicle ("EV"). The tariff provisions specify the Company's responsibility to keep its stations in good operating condition and to make any repairs as soon as reasonably possible. The tariff also provides the pricing the Company will charge for the use of its stations.

Q. What is the Company's goal for the pricing of its charging stations?

A. The Company's goal is to reflect current market prices for comparable charging while sending price signals that encourage individuals to use the stations in a way that reflects the Company's costs to provide this service. To achieve this goal, the Company based the pricing on the cost of similar charging service in Utah, but with a credit to reward off-peak charging and a per session fee to recover some of the fixed costs of providing this service.

Q. How did the Company base its pricing on the rates of other charging service providers?

A. Of all the publicly available charging stations in Utah, those currently owned and operated by Electrify America are most like those the Company plans to own and operate, and so the Company created tariff prices that are based upon Electrify America's current market cost.

Q. What are the pricing elements the Company proposes for the tariff?

A. The Company proposes that individuals be charged an Energy Charge, a Session Fee,

and be credited for off-peak usage. The Energy Charge will vary based on the power level for the session and whether the individual is a retail customer of the Company in Utah. The off-peak energy credit will use the same time periods as Schedule 2E, which will ensure that the experience for individuals utilizing the Company's charging stations and residential customers participating in the time-of-use program is consistent, particularly for EV owners who charge under the Company's time-of-use rates at home. Exhibit RMP___(RMM-2) shows the calculations supporting the values of the Company's proposed prices.

Q. What prices does the Company propose for Schedule 60?

A. The Company proposes $0.40 per kWh for charging from direct current ("DC") fast chargers by non-Rocky Mountain Power customers, $0.15 per kWh for charging from DC fast chargers by Rocky Mountain Power customers, $0.08 per kWh for level 2 charging by any user, a $0.05 per kWh credit for off-peak charging, and a $1.00 per Session Fee.

Q. What is the Session Fee?

A. The Session Fee is a charge that is assessed every time a user plugs in and transacts with the Company for charging services at one of its stations.

Q. Why is the Company proposing a Session Fee?

A. A very significant component of providing charging services is fixed and does not vary with incremental usage. The Company therefore believes that establishing this pricing component, even at a relatively low initial level, as part of the rate structure from the onset of this program, is important. The Company also anticipates that, depending upon the vendor ultimately selected, there may be transaction fees associated with credit card

payments. Under such a circumstance, a Session Fee sends an important price signal to users about the direct cost to transact for the service irrespective of the level of energy delivered.

Q. Why is the Company proposing the Session Fee be set at $1.00?

A. While sending appropriate price signals is important, this must be balanced with the goal of customer acceptance and ease of use. For an EV driver who is considering the cost to get the charge needed to complete the next leg of travel, a per kWh charge is the most comprehensible. The Company therefore believes that setting the preponderance of the cost to use its charging services as volumetric energy charges serves to make its pricing easy to understand and accessible. For most people, one dollar is a small nominal fee to pay which will not greatly impede the simplicity of the rate structure, while still serving as an important price signal.

Q. How did the Company calculate Schedule 60's proposed energy charges?

A. For DC fast charging, the Company wanted to set its price for non-Rocky Mountain Power customers at a level that was comparable to similar services offered in the marketplace. Electrify America, who has charging stations that are the most like the ones the Company plans to deploy, presently charges $0.43 per kWh. Assuming a 100 kWh charge, which would be the same as using a 150 kW charger for 40 minutes, and the $1.00 Session Fee, the Company estimates that a $0.40 per kWh charge would be equivalent after rounding to the nearest ten cents. The Company proposes this price would be assessed to non-Rocky Mountain Power customers.

Since the Company's Utah customers pay for EVIP as part of their monthly bills through Schedule 198, the Company proposes that its Utah customers would

receive a 75 percent discount on the proportion of the cost for DC fast charging service that is above the utility's marginal cost of service. Using the 6.4233 cents per kWh marginal cost of service value for Electric Service Schedule No. 6 – General Service – Distribution Voltage ("Schedule 6") from the Company's most recent general rate case,[1] the Company calculated a 15 cents per kWh charge for DC fast charging by Rocky Mountain Power customers.

For level 2 charging, the Company calculated a rate that approximated the 6.4233 cents per kWh marginal cost of service for Schedule 6 after incorporating a time-varying element and accounting for the $1.00 Session Fee. First, the Company calculated an off-peak price of $0.03 per kWh based off of the average Energy Imbalance Market ("EIM") prices during off-peak times in a three-year period.[2] Average EIM prices are a reasonable approximation for the cost to the Company to procure energy at different times of the day, which makes them useful for developing a time-of-use price signal. Next, the Company determined that assuming a 42 kWh charging session, which is the same as 6 hours of charging at 7 kW, an on-peak price of $0.08 per kWh would yield the average Schedule 6 marginal cost of service price. Instead of using on- and off-peak prices, the Company used an energy charge for all usage of $0.08 per kWh and an off-peak credit of -$0.05 per kWh. Since a time varying element can encourage an efficient use of the system for all charging levels, the Company proposes that the same -$0.05 per kWh off-peak energy credit would apply to DC fast charging as well. Table 1 below shows the proposed prices for Schedule 60.

[1] See Schedule 6 marginal cost, excluding retail costs in Docket No. 20-035-04 on page 4 of Exhibit RMP___(RMM-15).
[2] 36 months ended September 30, 2020.

Table 1. Proposed Schedule 60 Prices

Energy Charge	Non-RMP Customer	RMP Customer
DC Fast Charging:	$0.40 per kWh	$0.15 per kWh
Level 2 Charging:	$0.08 per kWh	$0.08 per kWh
Off-Peak Credit:	-$0.05 per kWh	-$0.05 per kWh

Session Fee
$1.00

Exhibit RMP___(RMM-2) shows the calculation of proposed Schedule 60 rates.

Q. How does the Company's proposed pricing compare to the cost of gasoline?

A. A rule of thumb is that every cent per kWh is the same as 10 cents per gallon gasoline equivalency.[3] Assuming this, DC fast charging for Rocky Mountain Power customers at 15 cents per kWh would be the same as paying $1.50 per gallon for gasoline which compares favorably to gasoline, which presently costs about $3.16 per gallon in Utah.[4]

Q. Will there be an incentive for individuals to make charging stations available to others once their session has completed?

A. Yes. The Company proposes to include a provision in the tariff that allows for the imposition of a penalty on any individual that does not make a charging station available to others upon session completion.

[3] This holds true if a conventional internal combustion vehicle gets 30 miles to the gallon and an electric vehicle gets 3 miles to the kWh.
[4] $3.159 was the average price for a gallon of gasoline in Utah on July 22, 2021, per the American Automobile Association's website. See https://gasprices.aaa.com/?state=UT.

Q. With the export credit price in Electric Service Schedule No. 137 – Net Billing Service currently set at around 5.5 to 5.8 cents per kWh, depending on season, is the Company concerned that an arbitrage opportunity may exist, since proposed Schedule 60's off-peak level 2 charging rate is just 3.0 cents per kWh?

A. Not at this time. If a customer were to charge their car with 100 kWh in the summer season during off-peak from a level 2 charger, the cost of that charge would be $4—$1 for the Session Fee and $3 for the energy. If the car had the vehicle-to-grid ability to export onto the grid, it could then, in theory, sell that energy back to the Company for close to $6 producing a $2 surplus for that customer. The Company believes, however, that such an arbitrage would be very challenging for two reasons. First, level 2 charging takes several hours to complete and a customer with an EV may not want to tie up his or her car for a large portion of the day to make $2. Second, there are efficiency losses associated with charging an electric vehicle and then discharging to the grid. One study estimated that the roundtrip efficiency for vehicle-to-grid is only between 53 to 62 percent.[5] Incurring such losses would wipe out any potential upside from potential vehicle-to-grid arbitrage.

Q. Does the Company have a plan to ensure prices remain reflective of costs as the electric vehicle industry continues to change?

A. Yes. As authorized in Utah Code section 54-4-41, the Company proposes that the pricing to transition to cost of service over a reasonable time frame.[6] The transition will be based on the Company's annual informational cost-of-service studies, which inform how well the revenue from a customer class recovers its corresponding cost-of-

[5] See https://www.sciencedirect.com/science/article/abs/pii/S0360544217317863?via%3Dihub.
[6] See H.B. 396, 54-4-41. Recovery of investment in utility-owned vehicle charging infrastructure. (2) (b) (ii).

service. To isolate the Company's charging stations in the studies, the Company will include them as a separate customer class beginning with the study the Company will file on June 15, 2023 for calendar year 2022.

Q. What does the Company consider a reasonable time frame, and how does it propose to transition the pricing over this time frame?

A. The Company currently anticipates a 10-year time frame for the transition, with greater pricing stability in the first 5 years, subject to limited adjustments or modifications if warranted. After this initial period, the transition would then follow a prescribed glide path to cost-of-service over the next five years. This glide path would include annual pricing adjustments that move the pricing 20 percent toward cost-of-service in the sixth year, 40 percent in the seventh year, 60 percent in the eighth year, 80 percent in the ninth year, and 100 percent in the tenth year. After the tenth year, the Company plans to continue to isolate the Company's charging stations in its annual studies and adjust the pricing as-needed to account for the stations' cost-of-service and the evolving needs of the electric vehicle industry. During the transition to cost of service, the Company may request the discount for Rocky Mountain Power customers be reduced or that specific elements of the overall rate structure have greater or lesser changes in their price. If the revenue from charging stations were to exceed cost of service, the Company would make a request with the Commission proposing what to do with the excess funds which could include refunding it back to all customers, lowering the Schedule 60 price, investing in additional electric vehicle infrastructure, or some combination of those actions.

Q. How would the prices in Schedule 60 potentially change during the first five years of the program?

A. The Company proposes that Schedule 60 rates would change by the same percentage as any base price change for all of its Utah customers rounded to the nearest cent. In this way, its rates would rise or fall commensurate with price changes for its regular retail customers, including other providers of charging services within the Company's service area. Adjusting the prices periodically will also serve as a reminder to users of the Company's charging service that its pricing is subject to change. If conditions warrant further changes within the first five years to respond to dramatic changes to the circumstances in the market or in the cost of providing charging services, the Company proposes that it be able to make a filing with the Commission requesting such a change. The first five years of price stability with limited adjustments and the glide path to cost of service for the second five-year period are described in the Special Conditions of Schedule 60.

Q. Would the time of use hours for the off-peak credit on Schedule 60 be subject to change?

A. Yes. If the Company implements a successor time-of-use program for residential customers, it would propose aligning Schedule 60 with the hours from such a program.

Electric Vehicle Infrastructure Program Cost Recovery

Q. Please describe proposed Schedule 198.

A. Proposed Schedule 198 – Electric Vehicle Infrastructure Program Cost Adjustment, shown on Exhibit RMP___(RMM-1) provides the prices customers would pay to recover the cost associated with the EVIP described by Company witness Mr.

Campbell. Utah Code section 54-4-41 authorizes the Company to collect up to $50 million from Utah retail customers to fund EVIP. The Company therefore proposes to collect from customers $5 million per year for ten years. The Company would periodically review its collection to ensure that it does not collect more than the authorized $50 million amount.

Q. How were Schedule 198 prices determined?

A. The costs of the program were spread to customer classes as an equal percentage of total base revenue and rates were designed as percentage adjustments to be applied to the Power Charge, Energy Charge, Facilities Charge, Back-Up Power Charge, Excess Power Charge, Daily Power Charge and Voltage Discount.

Q. What is the rate impact of proposed Schedule 198?

A. The rate impact to customers of proposed Schedule 198 is a 0.2 percent increase effective January 1, 2022. This increase will be offset by the expiration of Electric Service Schedule No. 196 – Sustainable Transportation and Energy Plan ("STEP") Cost Adjustment ("Schedule 196"), which is set to expire on December 31, 2021[7]. Taken together, the net impact of Schedule 198 and expiring Schedule 196 is a 0.2 percent decrease for customers. Page one of Exhibit RMP___(RMM-3) shows the effect of the Company's proposed Schedule 198 by class net of the expiration of Schedule 196. Page two of Exhibit RMP___(RMM-3) shows the proposed rate spread for Schedule 198. Pages three through 21 of Exhibit RMP___(RMM-3) show the billing determinants, and proposed rates for Schedule 198. Implementation of the

[7] *See* Utah Code 54-20-102 and 54-20-105(3)(d).

Schedule 198 adjustment and expiration of Schedule 196 will result in a $0.21 monthly decrease for the typical residential customer using 775 kWh.

Q. How does the Company propose to reconcile revenues from the charging stations to the costs of electric vehicle charging?

A. As described in Mr. Campbell's direct testimony, revenue from the charging stations will be credited to the balancing account for EVIP. Surplus revenue over what was planned could then be used to lower the price on Schedule 198 or could be re-invested into additional electric vehicle infrastructure.

Extension of Schedule 2E Residential Electric Vehicle Time of Use Pilot

Q. Please briefly describe Schedule 2E.

A. Schedule 2E is an optional time of use pilot for residential customers that can provide proof of electric vehicle registration and was created to comply with a provision in STEP. Schedule 2E took effect in 2017 and was closed to new participants at the end of 2020. At the end of this year, the Company will submit a report on Schedule 2E that will discuss the costs and benefits of the program. Unless modified by the Commission, Schedule 2E is set to terminate on December 31, 2021.

Q. What does the Company recommend for Schedule 2E in this filing?

A. The Company recommends that the Commission extend Schedule 2E for another six months, so that it will not automatically terminate until June 30, 2022.

Q. Why is the Company proposing a six-month extension for Schedule 2E?

A. The Company believes that it would be better to terminate the program after it has had an opportunity to file its report on the electric vehicle time of use pilot and interested parties have had a chance to provide comments. If the report shows that the benefits

outweigh the costs of the program, then it may appropriate to continue Schedule 2E in some form. If the benefits do not outweigh the cost, then Schedule 2E could then be terminated.

Extension of Schedule 120 Plug-in Electric Vehicle Incentive Program

Q. Please describe Schedule 120 and the Company's purpose in seeking an extension.

A. Schedule 120 provides incentives to customers to cover a portion of the costs of installing EV chargers. Schedule 120 was originally created pursuant to the STEP program, and it is scheduled to terminate January 1, 2022. As discussed in the direct testimony of Mr. Campbell, one of the elements of the EVIP are incentives and the Company plans to continue providing the incentives throughout the duration of the EVIP. Accordingly, the Company proposes to extend Schedule 120 through January 1, 2032.

Q. Does this conclude your direct testimony?

A. Yes.

Rocky Mountain Power
Exhibit RMP___(RMM-1)
Docket No. 20-035-34
Witness: Robert M. Meredith

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of Robert M. Meredith

Proposed Tariffs

August 2021

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

First Revision of Sheet No. 2E.3
P.S.C.U. No. 51 **Canceling Original Sheet No. 2E.3**

ELECTRIC SERVICE SCHEDULE NO. 2E – Continued

SPECIAL CONDITIONS:

1. Customer on this tariff schedule shall have a term of not less than one year. Service will continue under this schedule until Customer notifies the Company to discontinue service, or if the Company, upon approval by the Commission, otherwise terminates this optional tariff schedule.

2. Customer on this tariff schedule who is not a part of the load research study shall elect either rate option 1 or rate option 2. Upon request of the Customer, the Company shall change the rate option under which the customer is billed up to one time per year.

3. Billing under this schedule shall begin for the Customer following installation of the time-of-use meter and the initial meter reading.

4. Enrollment in this Electric Service Schedule is subject to the availability of funds for the Plug-In Electric Vehicle Incentive Pilot Program.

5. The Company will not accept enrollment for accounts that have:

   - Time-payment agreement in effect
   - Received two or more final disconnect notices
   - Been disconnected for non-payment within the last 12 months.

6. Customers being served under this schedule may not participate in Net Metering (Schedule 135), Transition Program for Customer Generators (Schedule 136), Net Billing (Schedule 137) or Subscriber Solar (Schedule 73).

7. After December 31, 2020, the Company will no longer accept Customers onto this tariff schedule.

8. The tariff rate schedule is being offered as part of a temporary pilot program for consumer research purposes and is subject to change. This Schedule terminates June 30, 2022, unless modified by order of the Public Service Commission of Utah.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **Original Sheet No. 60.1**

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE SCHEDULE NO. 60

STATE OF UTAH

Company Operated Electric Vehicle Charging Station Service

AVAILABILITY: In all territory served by the Company in the State of Utah

APPLICATION: To electric vehicle charging service provided from Company operated electric vehicle charging stations.

BILLING: Any individual using Company operated electric vehicle charging stations for the purpose of recharging the battery of an electric vehicle shall pay both an Energy Charge and a Session Fee and Energy Charge as described below.

Energy Charge

	Non-RMP Customer	RMP Customer
DC Fast Charging:	$0.40 per kWh	$0.15 per kWh
Level 2 Charging:	$0.08 per kWh	$0.08 per kWh
Off-Peak Credit:	-$0.05 per kWh	-$0.05 per kWh

Session Fee

$1.00

TIME PERIODS:

On-Peak: October through May inclusive
8:00 a.m. to 10:00 a.m., and 3:00 p.m. to 8:00 p.m., Monday through Friday, except holidays.
June through September inclusive
3:00 p.m. to 8:00 p.m., Monday through Friday, except holidays.

Off-Peak: All other times.

Holidays include only New Year's Day, President's Day, Memorial Day, Independence Day, Pioneer Day, Labor Day, Thanksgiving Day, and Christmas Day. When a holiday falls on a Saturday or Sunday, the Friday before the holiday (if the holiday falls on a Saturday) or the Monday following the holiday (if the holiday falls on a Sunday) will be considered a holiday and consequently Off-Peak.

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **Original Sheet No. 60.2**

ELECTRIC SERVICE SCHEDULE NO. 60 – Continued

SPECIAL CONDITIONS:

1. The Company may impose a penalty on any individual who, upon session completion, does not make their station available to others.
2. Operation, repair and maintenance of electric vehicle charging stations on this rate schedule will be the responsibility of the Company.
3. Inoperable electric vehicle charging stations will be repaired as soon as reasonably possible, during regular business hours or as allowed by Company's operating schedule and requirements, provided the Company receives notification from a Consumer or a member of the public by notifying Rocky Mountain Power's customer service (1-888-221-7070).
4. The Company may at its discretion install, relocate, modify, or remove electric vehicle charging stations. Potential modifications to Company operated electric vehicle charging stations may include adding, removing, or changing electric vehicle supply equipment available for charging service.
5. For the first five years of the Electric Vehicle Incentive Program, prices listed on this tariff shall change by the same percentage as base retail price changes rounded to the nearest cent.
6. The Company may at its discretion file with the Commission to change rates on this schedule as the need arises.
7. From the sixth to the tenth years of the Electric Vehicle Incentive Program, price listed on this tariff shall transition to cost of service.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

First Revision of Sheet No. 120.1
P.S.C.U. No. 51 **Canceling Original Sheet No. 120.1**

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE SCHEDULE NO. 120

STATE OF UTAH

Plug-in Electric Vehicle Incentive Program

PURPOSE: This Schedule is intended to promote plug-in electric vehicle charging infrastructure.

APPLICABLE: To Rocky Mountain Power and all Customers taking service under the Company's General Service Schedules 1, 2, 2E, 3, 6, 6A, 7, 8, 9, 9A, 10, 11, 12, 15, 23, 31, and 32.

CUSTOMER PARTICIPATION: Customer participation is voluntary and is initiated by following the participation procedures on the Company website. The Company shall have the right to qualify participants, at its discretion, based on criteria the Company considers necessary to ensure the effective operation of the measures, utility system, and program budget. Program details, requirements, and current incentive levels can be viewed on the Company's website at www.rockymountainpower.net/pev.

Table 1 – Plug-in Electric Vehicle (PEV) Program Offerings

<table>
<tr><th>Category</th><th colspan="2">Measure</th><th>Incentives "up to"</th></tr>
<tr><td></td><td colspan="2"></td><td></td></tr>
<tr><td rowspan="5">Plug-in Electric Vehicle Charging Stations</td><td colspan="2">Residential AC Level 2 Charger
(For Customers on Schedules 1, 2, 2E, and 3)</td><td>$200 per charger up to 75% of total charger and/or installation cost</td></tr>
<tr><td rowspan="2">Non-Residential & Multi-Family AC Level 2 Charger</td><td>Single Port</td><td>$4,000 per charger up to 75% of total charger cost</td></tr>
<tr><td>Multi-Port</td><td>$7,000 per charger up to 75% of total charger cost</td></tr>
<tr><td rowspan="2">Non-Residential & Multi-Family DC Fast Charger</td><td>Single Port</td><td>$45,000 per charger up to 75% of total charger and installation costs</td></tr>
<tr><td>Multi-Port</td><td>$63,000 per charger up to 75% of total charger and installation costs</td></tr>
<tr><td>Custom</td><td colspan="2">Non-Residential & Multi-Family Grant-Based Custom Projects and Partnerships</td><td>Custom</td></tr>
</table>

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

First Revision of Sheet No. 120.2
P.S.C.U. No. 51 **Canceling Original Sheet No. 120.2**

ELECTRIC SERVICE SCHEDULE NO. 120 – Continued

AVAILABILITY: Availability for incentives listed in Table 1 above is subject to available funds. Availability of funds will be listed on the Company website and updated on a quarterly basis.

SPECIAL CONDITIONS:

Residential, Non-Residential and Multi-Family AC Level 2 Charger Prescriptive Incentive:

1. To be eligible for an incentive, Customers must submit a Program Administrator approved post-purchase application and meet all Program requirements.
2. Incentives will be available on a first come first served basis with an annual cap.
3. The Company and its agents reserve the right to inspect installations.
4. Applications may be subject to charger and per project caps.

Non-Residential and Multi-Family DC Fast Charger Prescriptive Incentive:

1. To be eligible for an incentive, Customers must submit a Program Administrator approved application(s), provide all required documentation, and receive pre-approval.
2. Equipment purchased or installed prior to receipt of the Company's pre-approval may not be eligible for incentives.
3. Pre-approval criteria may include, but is not limited to:
    a. Location variables such as proximity to other DC Fast Chargers;
    b. Overall benefits to the public;
    c. Costs of project and incentive amount;
    d. Technology being used;
    e. Availability to the public; and
    f. Number of chargers and per project caps.
4. Incentives will be available on a first come first served basis with an annual cap.
5. Customers must consent to provide charger usage data.
6. The Company and its agents reserve the right to inspect installations.

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

First Revision of Sheet No. 120.3
P.S.C.U. No. 51 **Canceling Original Sheet No. 120.3**

ELECTRIC SERVICE SCHEDULE NO. 120 – Continued

SPECIAL CONDITIONS: (continued)

Non-Residential and Multi-Family Grant-Based Custom Projects and Partnerships Incentive:

1. To be eligible for a custom incentive, Customers must submit a Program Administrator approved application(s), provide all required documentation, and go through a selection process.
2. The selection process may include, but is not limited to:
    a. Location variables such as proximity to other charging infrastructure;
    b. Overall benefits to the public;
    c. Costs of project and incentive amount;
    d. Technology being used;
    e. Availability to the public;
    f. Matching funds;
    g. Innovative partnerships and projects that support plug-in electric vehicle infrastructure and education; and
    h. Development of DC fast charging corridors
3. Customers must consent to provide charger usage data, if applicable.
4. Custom projects may be selected on a quarterly basis and will be limited to available funding.
5. The Company and its agents reserve the right to inspect installations.
6. Participants with new construction may submit an application for pre-approval, but will be held to all applicable timelines.

TERM: This Schedule terminates January 1, 2032, unless modified by order of the Public Service Commission of Utah.

ELECTRIC SERVICE REGULATIONS: Service under this Schedule will be in accordance with the terms of the Electric Service Agreement between the Customer and the Company. The Electric Service Regulations of the Company on file with and approved by the Public Service Commission of the State of Utah, including future applicable amendments, will be considered as forming a part of and incorporated in said Agreement.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **Original Sheet No. 198.1**

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE SCHEDULE NO. 198

STATE OF UTAH

Electric Vehicle Infrastructure Program (EVIP) Cost Adjustment

PURPOSE: The Electric Vehicle Infrastructure Program Cost Adjustment is designed to recover the costs incurred by the Company pursuant Utah Code Annotated § 54-4-41.

APPLICATION: This Schedule shall be applicable to all Customers taking service under the Company's electric service schedules.

TERM: The term of the EVIP Cost Adjustment shall be from January 1, 2022 until all authorized costs have been collected.

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **Original Sheet No. 198.2**

ELECTRIC SERVICE SCHEDULE NO. 198 - Continued

MONTHLY BILL: In addition to the Monthly Charges contained in the Customer's applicable schedule, all monthly bills shall have the following percentage increases applied to the Power Charge, Energy Charge, Facilities Charge and Voltage Discount of the Customer's applicable schedule and the applicable charges or credits of Schedule 94 and Schedule 98.

Schedule 1	0.30%
Schedule 2	0.30%
Schedule 2E	0.30%
Schedule 3	0.30%
Schedule 6	0.27%
Schedule 6A	0.28%
Schedule 7*	0.27%
Schedule 8	0.27%
Schedule 9	0.27%
Schedule 9A	0.27%
Schedule 10	0.27%
Schedule 11*	0.27%
Schedule 12*	0.27%
Schedule 15 (Traffic and Other Signal Systems)	0.34%
Schedule 15 (Metered Outdoor Nighttime Lighting)	0.36%
Schedule 22	0.27%
Schedule 23	0.29%
Schedule 31**	0.27%
Schedule 32***	0.27%
Contract 1	0.00%
Contract 2	0.00%
Contract 3	0.00%

* The Adjustment for Schedules 7, 11 and 12 shall be applied to the Charge Per Lamp.

** The Adjustment for Schedule 31 Customers shall be applied to Facilities Charges, Back-up Power Charges, and Excess Power Charges in addition to the applicable general service schedule charges.

*** The Adjustment for Schedule 32 Customers shall be applied to Delivery Facilities Charges and Daily Power Charges in addition to the applicable general service schedule charges.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51

First Revision of Sheet No. 2E.3
Canceling Original Sheet No. 2E.3

ELECTRIC SERVICE SCHEDULE NO. 2E – Continued

SPECIAL CONDITIONS:

1. Customer on this tariff schedule shall have a term of not less than one year. Service will continue under this schedule until Customer notifies the Company to discontinue service, or if the Company, upon approval by the Commission, otherwise terminates this optional tariff schedule.

2. Customer on this tariff schedule who is not a part of the load research study shall elect either rate option 1 or rate option 2. Upon request of the Customer, the Company shall change the rate option under which the customer is billed up to one time per year.

3. Billing under this schedule shall begin for the Customer following installation of the time-of-use meter and the initial meter reading.

4. Enrollment in this Electric Service Schedule is subject to the availability of funds for the Plug-In Electric Vehicle Incentive Pilot Program.

5. The Company will not accept enrollment for accounts that have:

   - Time-payment agreement in effect
   - Received two or more final disconnect notices
   - Been disconnected for non-payment within the last 12 months.

6. Customers being served under this schedule may not participate in Net Metering (Schedule 135), Transition Program for Customer Generators (Schedule 136), Net Billing (Schedule 137) or Subscriber Solar (Schedule 73).

7. After December 31, 2020, the Company will no longer accept Customers onto this tariff schedule.

8. The tariff rate schedule is being offered as part of a temporary pilot program for consumer research purposes and is subject to change. This Schedule terminates ~~January 1~~June 30, 2022, unless modified by order of the Public Service Commission of Utah.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **First Revision of Sheet No. 120.1**
Canceling Original Sheet No. 120.1

ROCKY MOUNTAIN POWER

ELECTRIC SERVICE SCHEDULE NO. 120

STATE OF UTAH

Plug-in Electric Vehicle Incentive ~~Pilot~~ Program

PURPOSE: This Schedule is intended to promote plug-in electric vehicle charging infrastructure ~~and Time of Use (TOU) rates~~.

APPLICABLE: To Rocky Mountain Power and all Customers taking service under the Company's General Service Schedules 1, 2, 2E, 3, 6, 6A, 7, 8, 9, 9A, 10, 11, 12, 15, 23, 31, and 32.

CUSTOMER PARTICIPATION: Customer participation is voluntary and is initiated by following the participation procedures on the Company website. The Company shall have the right to qualify participants, at its discretion, based on criteria the Company considers necessary to ensure the effective operation of the measures, utility system, and program budget. Program details, requirements, and current incentive levels can be viewed on the Company's website at www.rockymountainpower.net/pev.

Table 1 – Plug-in Electric Vehicle (PEV) Program Offerings

Category	Measure		Incentives "up to"
~~Residential Time of Use Pilot Program~~	~~Participation in Residential Time of Use Rate Electric Service Schedule 2E~~		~~$200 per customer~~
Plug-in Electric Vehicle Charging Stations	Residential AC Level 2 Charger (For Customers on Schedules 1, 2, 2E, and 3)		$200 per charger up to 75% of total charger and/or installation cost
	Non-Residential & Multi-Family AC Level 2 Charger	Single Port	$4,000 per charger up to 75% of total charger cost
		Multi-Port	$7,000 per charger up to 75% of total charger cost
	Non-Residential & Multi-Family DC Fast Charger	Single Port	$45,000 per charger up to 75% of total charger and installation costs
		Multi-Port	$63,000 per charger up to 75% of total charger and installation costs
Custom	Non-Residential & Multi-Family Grant-Based Custom Projects and Partnerships		Custom

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51 **First Revision of Sheet No. 120.2**
Canceling Original Sheet No. 120.2

ELECTRIC SERVICE SCHEDULE NO. 120 – Continued

AVAILABILITY: Availability for incentives listed in Table 1 above is subject to available funds. Availability of funds will be listed on the Company website and updated on a ~~monthly~~quarterly basis.

SPECIAL CONDITIONS:

~~**Time of Use Rate:**~~

~~1. Eligibility criteria for participation may include, but is not limited to:~~
~~a. Customers must meet all participation requirements and special conditions established in Electric Service Schedule 2E.~~
~~2. Participation incentives for Electric Service Schedule 2E will be provided to customers shortly after enrollment.~~
~~3. Participants in the Time of Use Load Research Study are eligible for an additional incentive payment, as specified in Electric Service Schedule 121.~~

Residential, Non-Residential and Multi-Family AC Level 2 Charger Prescriptive Incentive:

1. To be eligible for an incentive, Customers must submit a Program Administrator approved post-purchase application and meet all Program requirements.
2. Incentives will be available on a first come first served basis with an annual cap.
3. The Company and its agents reserve the right to inspect installations.
4. Applications may be subject to charger and per project caps.

Non-Residential and Multi-Family DC Fast Charger Prescriptive Incentive:

1. To be eligible for an incentive, Customers must submit a Program Administrator approved application(s), provide all required documentation, and receive pre-approval.
2. Equipment purchased or installed prior to receipt of the Company's pre-approval may not be eligible for incentives.
3. Pre-approval criteria may include, but is not limited to:
   a. Location variables such as proximity to other DC Fast Chargers;
   b. Overall benefits to the public;
   c. Costs of project and incentive amount;
   d. Technology being used;
   e. Availability to the public; and
   f. Number of chargers and per project caps.
4. Incentives will be available on a first come first served basis with an annual cap.
5. Customers must consent to provide charger usage data.

(continued)

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51

First Revision of Sheet No. 120.2
Canceling Original Sheet No. 120.2

ELECTRIC SERVICE SCHEDULE NO. 120 – Continued

6. The Company and its agents reserve the right to inspect installations.

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

P.S.C.U. No. 51

First Revision of Sheet No. 120.3
Canceling Original Sheet No. 120.3

ELECTRIC SERVICE SCHEDULE NO. 120 – Continued

SPECIAL CONDITIONS: (continued)

Non-Residential and Multi-Family Grant-Based Custom Projects and Partnerships Incentive:

1. To be eligible for a custom incentive, Customers must submit a Program Administrator approved application(s), provide all required documentation, and go through a selection process.
2. The selection process may include, but is not limited to:
    a. Location variables such as proximity to other charging infrastructure;
    b. Overall benefits to the public;
    c. Costs of project and incentive amount;
    d. Technology being used;
    e. Availability to the public;
    f. Matching funds;
    g. Innovative partnerships and projects that support plug-in electric vehicle infrastructure and education; and
    h. Development of DC fast charging corridors
3. Customers must consent to provide charger usage data, if applicable.
4. Custom projects may be selected on a quarterly basis and will be limited to available funding.
5. The Company and its agents reserve the right to inspect installations.
6. Participants with new construction may submit an application for pre-approval, but will be held to all applicable timelines.

TERM: This Schedule terminates January 1, 2032~~22~~, unless modified by order of the Public Service Commission of Utah.

ELECTRIC SERVICE REGULATIONS: Service under this Schedule will be in accordance with the terms of the Electric Service Agreement between the Customer and the Company. The Electric Service Regulations of the Company on file with and approved by the Public Service Commission of the State of Utah, including future applicable amendments, will be considered as forming a part of and incorporated in said Agreement.

Rocky Mountain Power
Exhibit RMP___(RMM-2)
Docket No. 20-035-34
Witness: Robert M. Meredith

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of Robert M. Meredith

Calculation of Proposed Charging Station Pricing

August 2021

Company Operated Electric Vehicle Charging Station Service
Calculation of Proposed Prices

Line	Component	Value	Source
1	Total Charging Cost per kWh	$0.430000	Electrify America Pricing for 350 kW Charging in Utah as of July 2021
2	Schedule 6 Marginal Cost per kWh	$0.064233	Docket 20-035-04
3	Off-Peak Energy Cost per kWh	$0.030051	Energy Imbalance Market from July 2017 thru September 2020
4	Schedule 6 On-Peak kWh as a Percentage of Total kWh[1]	21%	Docket 20-035-04
5	kWh per Session (DC Fast Charging)	100	Assumed
6	Cost per Session (DC Fast Charging)	$43.00	Line 1 * Line 5
7	kWh per Session (Level 2)	42	Assumed
8	Cost per Session (Level 2)	$2.70	Line 2 * Line 7
9	Non-RMP DC Fast Charging ($/kWH)	$0.40	(Line 6 - Line 13) / Line 5 Rounded to Nearest $0.10
10	RMP Customer DC Fast Charging ($/kWH)	$0.15	(Line 9 - Line 2) * 25% + Line 2
11	Level 2 Charging ($/kWh)	$0.08	((Line 8 - Line 13) / Line 7 - (1 - Line 4) * Line 3) / Line 4
12	Off-Peak Discount ($/kWh)	-$0.05	Line 3 - Line 11
13	Per Session Fee	$1.00	

[1]According to Schedule 2E Time Periods

Rocky Mountain Power
Exhibit RMP___(RMM-3)
Docket No. 20-035-34
Witness: Robert M. Meredith

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF UTAH

ROCKY MOUNTAIN POWER

Exhibit Accompanying Direct Testimony of Robert M. Meredith

Schedule 198 Calculation

August 2021

Table A
Rocky Mountain Power
Estimated Effect of Proposed Changes
on Revenues from Electric Sales to Ultimate Consumers in Utah
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

Line No.	Description	Sch No.	No. of Customers Forecast	MWh Forecast	Present Revenue ($000)	Proposed Sch 198 ($000)	Proposed Sch 198 (%)	Expiring Sch 196 ($000)	Expiring Sch 196 (%)	Net Price Change ($000)	Net Price Change (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7) (6)/(5)	(8)	(9) (8)/(5)	(10) (6)+(8)	(11) (10)/(5)
	Residential										
1	Residential	1,3	857,245	6,776,607	$749,389	$1,995	0.3%	($3,803)	-0.5%	($1,808)	-0.2%
2	Residential-Optional TOD	2/2E	623	6,392	$618	$2	0.3%	($3)	-0.5%	($2)	-0.2%
3	AGA/Revenue Credit	--			$7						
4	**Total Residential**		857,868	6,782,999	$750,014	$1,996	0.3%	($3,806)	-0.5%	($1,810)	-0.2%
	Commercial & Industrial & OSPA										
5	General Service-Distribution	6	13,530	5,789,707	$476,830	$1,269	0.3%	($2,578)	-0.5%	($1,309)	-0.3%
6	General Service-Distribution-Energy TOD	6A	2,807	404,256	$47,104	$125	0.3%	($254)	-0.5%	($128)	-0.3%
7	*Subtotal Schedule 6*		16,337	6,193,963	$523,934	$1,394	0.3%	($2,831)	-0.5%	($1,437)	-0.3%
8	General Service-Distribution > 1,000 kW	8	249	2,020,703	$148,126	$394	0.3%	($799)	-0.5%	($404)	-0.3%
9	General Service-High Voltage	9	158	4,848,931	$273,347	$728	0.3%	($1,473)	-0.5%	($746)	-0.3%
10	General Service-High Voltage-Energy TOD	9A	9	41,940	$2,993	$8	0.3%	($16)	-0.5%	($8)	-0.3%
11	*Subtotal Schedule 9*		167	4,890,871	$276,340	$735	0.3%	($1,489)	-0.5%	($754)	-0.3%
12	Irrigation	10	3,339	206,134	$16,045	$42	0.3%	($86)	-0.5%	($43)	-0.3%
13	Irrigation-Time of Day	10TOD	269	24,258	$1,956	$5	0.3%	($11)	-0.5%	($5)	-0.3%
14	*Subtotal Irrigation*		3,608	230,392	$18,000	$48	0.3%	($96)	-0.5%	($49)	-0.3%
15	General Service-Distribution-Small	23	96,230	1,404,452	$138,042	$367	0.3%	($734)	-0.5%	($366)	-0.3%
16	Back-up, Maintenance, & Supplementary	31	7	189,259	$12,590	$34	0.3%	($68)	-0.5%	($34)	-0.3%
17	Svc. From Ren. Ene. Facilities	32	3	196,650	$13,353	$9	0.1%	($19)	-0.1%	($10)	-0.1%
18	Ren. Ene. Pur. for Qlf. Cust > 5,000 kW	34	1	242,230	$13,028	$0	0.0%	$0	0.0%	$0	0.0%
17	Contract 1	--	1	617,100	$31,874	$0	0.0%	$0	0.0%	$0	0.0%
19	Contract 2	--	1	705,456	$31,979	$0	0.0%	$0	0.0%	$0	0.0%
20	Contract 3	--	1	1,288,626	$62,958	$0	0.0%	$0	0.0%	$0	0.0%
21	AGA/Revenue Credit	--			$4,797		0.0%		0.0%		0.0%
22	**Total Commercial & Industrial & OSPA**		116,605	17,979,703	$1,275,021	$2,982	0.2%	($6,036)	-0.5%	($3,054)	-0.2%
	Public Street Lighting										
23	Security Area Lighting	7	6,491	10,498	$1,383	$4	0.3%	($7)	-0.5%	($4)	-0.3%
24	Street Lighting - Company Owned	11	715	13,573	$3,759	$10	0.3%	($20)	-0.5%	($10)	-0.3%
25	Street Lighting - Customer Owned	12	1,229	26,869	$1,385	$4	0.3%	($7)	-0.5%	($4)	-0.3%
26	Metered Outdoor Lighting	15	637	15,963	$781	$2	0.3%	($4)	-0.5%	($2)	-0.3%
27	Traffic Signal Systems	15	2,734	7,776	$803	$2	0.3%	($4)	-0.6%	($2)	-0.3%
28	*Subtotal Public Street Lighting*		11,806	74,679	$8,111	$22	0.3%	($44)	-0.5%	($22)	-0.3%
29	Security Area Lighting-Contracts (PTL)	--	4	7	$1	$0	0.0%	$0	0.0%	$0	0.0%
30	AGA/Revenue Credit	--			$5		0.0%		0.0%		0.0%
31	**Total Public Street Lighting**		11,810	74,686	$8,116	$22	0.3%	($44)	-0.5%	($22)	-0.3%
32	**Total Sales to Ultimate Customers**		986,283	24,837,388	$2,033,151	$5,000	0.2%	($9,886)	-0.5%	($4,886)	-0.2%

Rate Spread
Rocky Mountain Power
Estimated Effect of Proposed Changes
on Revenues from Electric Sales to Ultimate Consumers in Utah
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

Line No.	Description	Sch No.	Present Revenues ($000)	Proposed Revenues ($000)	Schedule 198 ($000)	Schedule 198 %
	(1)	(2)	(3)	(4)	(5)	(6)
	Residential					
1	Residential	1,3	$749,389	$751,383	$1,995	0.3%
2	Residential-Optional TOD	2/2E	$618	$620	$2	0.3%
3	AGA/Revenue Credit	--	$7	$7		
4	**Total Residential**		$750,014	$752,010	$1,996	0.3%
	Commercial & Industrial & OSPA					
5	General Service-Distribution	6	$476,830	$478,099	$1,269	0.3%
6	General Service-Distribution-Energy TOD	6A	$47,104	$47,229	$125	0.3%
7	*Subtotal Schedule 6*		$523,934	$525,328	$1,394	0.3%
8	General Service-Distribution > 1,000 kW	8	$148,126	$148,520	$394	0.3%
9	General Service-High Voltage	9	$273,347	$274,074	$728	0.3%
10	General Service-High Voltage-Energy TOD	9A	$2,993	$3,001	$8	0.3%
11	*Subtotal Schedule 9*		$276,340	$277,075	$735	0.3%
12	Irrigation	10	$16,045	$16,087	$43	0.3%
13	Irrigation-Time of Day	10TOD	$1,956	$1,961	$5	0.3%
14	*Subtotal Irrigation*		$18,000	$18,048	$48	0.3%
15	General Service-Distribution-Small	23	$138,042	$138,409	$367	0.3%
16	Back-up, Maintenance, & Supplementary	31	$12,590	$12,624	$34	0.3%
17	Svc. From Ren. Ene. Facilities	32	$13,353	$13,362	$9	0.1%
18	Ren. Ene. Pur. for Qlf. Cust > 5,000 kW	34	$13,028	$13,028	$0	0.0%
17	Contract 1	--	$31,874	$31,874	$0	0.0%
19	Contract 2	--	$31,979	$31,979	$0	0.0%
20	Contract 3	--	$62,958	$62,958	$0	0.0%
21	AGA/Revenue Credit	--	$4,797	$4,797		
22	**Total Commercial & Industrial & OSPA**		$1,275,021	$1,278,003	$2,982	0.2%
	Public Street Lighting					
23	Security Area Lighting	7	$1,383	$1,387	$4	0.3%
24	Street Lighting - Company Owned	11	$3,759	$3,769	$10	0.3%
25	Street Lighting - Customer Owned	12	$1,385	$1,389	$4	0.3%
26	Metered Outdoor Lighting	15	$781	$783	$2	0.3%
27	Traffic Signal Systems	15	$803	$805	$2	0.3%
28	*Subtotal Public Street Lighting*		$8,111	$8,133	$22	0.3%
29	Security Area Lighting-Contracts (PTL)	--	$1	$1		
30	AGA/Revenue Credit	--	$5	$0		
31	**Total Public Street Lighting**		$8,116	$8,133	$22	0.3%
32	**Total Sales to Ultimate Customers**		$2,033,151	$2,038,146	$5,000	0.2%

$5,000

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 1- Residential Service							
Total Customer	9,344,849						
Customer Charge - 1 Phase	9,329,308						
Single Family	7,140,845	$10.00	$71,408,450				
Multi Family	2,188,463	$6.00	$13,130,778				
Customer Charge - 3 Phase	15,541						
Single Family	3,325	$20.00	$66,502				
Multi Family	12,216	$12.00	$146,592				
Aggregate Charge	0	$2.00	$0				
Non-Standard Meter Reading Fee	253	$22.00	$5,566				
On-Peak kWh (Jun - Sept)	0	4.3560 ¢	$0	0.58%	$0	0.30%	$0
Off-Peak kWh (Jun - Sept)	0	(1.6334) ¢	$0	0.58%	$0	0.30%	$0
First 400 kWh (Jun-Sept)	1,080,475,945	9.0279 ¢	$97,544,288	0.58%	$565,757	0.30%	$296,718
Next 600 kWh (Jun-Sept)	960,049,471	11.7210 ¢	$112,527,398	0.58%	$652,659	0.30%	$342,295
All add'l kWh (Jun-Sept)	527,790,900	11.7210 ¢	$61,862,371	0.58%	$358,802	0.30%	$188,178
First 400 kWh (Oct-May)	2,051,977,461	7.9893 ¢	$163,938,635	0.58%	$950,844	0.30%	$498,682
All add'l kWh (Oct-May)	1,671,527,763	10.3725 ¢	$173,379,217	0.58%	$1,005,599	0.30%	$527,399
Subscriber Solar kWh	15,864,580	11.9126 ¢	$1,889,884	0.58%	$10,961	0.30%	$5,749
Subscriber Solar kWh Adj	(316,213)						
Total	6,307,369,907		$695,899,681		$3,544,622		$1,859,021
Schedule No. 2 - Residential Service - Optional Time-of-Day							
Total Customer	4,350						
Customer Charge - 1 Phase	4,339						
Single Family	3,371	$10.00	$33,710				
Multi Family	968	$6.00	$5,808				
Customer Charge - 3 Phase	11						
Single Family	11	$20.00	$220				
Multi Family	0	$12.00	$0				
Aggregate Charge	0	$2.00	$0				
Non-Standard Meter Reading Fee	0	$22.00	$0				
On-Peak kWh (Jun - Sept)	258,230	4.3560 ¢	$11,248	0.58%	$65	0.30%	$34
Off-Peak kWh (Jun - Sept)	825,288	(1.6334) ¢	($13,480)	0.58%	($78)	0.30%	($41)
First 400 kWh (Jun-Sept)	495,959	9.0279 ¢	$44,775	0.58%	$260	0.30%	$136
Next 600 kWh (Jun-Sept)	407,470	11.7210 ¢	$47,760	0.58%	$277	0.30%	$145
All add'l kWh (Jun-Sept)	186,496	11.7210 ¢	$21,859	0.58%	$127	0.30%	$66
First 400 kWh (Oct-May)	919,695	7.9893 ¢	$73,477	0.58%	$426	0.30%	$224
All add'l kWh (Oct-May)	734,416	10.3725 ¢	$76,177	0.58%	$442	0.30%	$232
Subscriber Solar kWh	0	11.9126 ¢	$0	0.58%	$0	0.30%	$0
Subscriber Solar kWh Adj	0						
Total	2,744,036		$301,554		$1,519		$796

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 2E - Electric Vehicle Time-of-Use Pilot Option							
Total Customer	3,114						
Customer Charge - 1 Phase	3,114						
Single Family	2,923	$10.00	$29,230				
Multi Family	191	$6.00	$1,146				
Customer Charge - 3 Phase	0						
Single Family		$20.00	$0				
Multi Family		$12.00	$0				
Aggregate Charge	0	$2.00	$0				
Non-Standard Meter Reading Fee	0	$22.00	$0				
Rate Option 1							
On-Peak kWh	206,699	21.0339 ¢	$43,477	0.58%	$252	0.30%	$132
Off-Peak kWh	963,611	6.4097 ¢	$61,765	0.58%	$358	0.30%	$188
Rate Option 2							
On-Peak kWh	347,186	32.4592 ¢	$112,694	0.58%	$654	0.30%	$343
Off-Peak kWh	2,130,652	3.2108 ¢	$68,411	0.58%	$397	0.30%	$208
Subscriber Solar kWh	0	11.9126 ¢	$0	0.58%	$0	0.30%	$0
Subscriber Solar kWh Adj	0						
Total	3,648,148		$316,723		$1,661		$871
Schedule No. 3- Residential Service - Low Income Lifeline Program							
Total Customer	216,323						
Customer Charge - 1 Phase	216,152						
Single Family	113,309	$10.00	$1,133,090				
Multi Family	102,843	$6.00	$617,058				
Customer Charge - 3 Phase	171						
Single Family	27	$20.00	$540				
Multi Family	144	$12.00	$1,728				
Aggregate Charge	0	$2.00	$0				
Non-Standard Meter Reading Fee	0	$22.00	$0				
On-Peak kWh (Jun - Sept)	5,354	4.3560 ¢	$233	0.58%	$1	0.30%	$1
Off-Peak kWh (Jun - Sept)	15,633	(1.6334) ¢	($255)	0.58%	($1)	0.30%	($1)
First 400 kWh (Jun-Sept)	26,384,768	9.0279 ¢	$2,381,990	0.58%	$13,816	0.30%	$7,246
Next 600 kWh (Jun-Sept)	17,765,859	11.7210 ¢	$2,082,336	0.58%	$12,078	0.30%	$6,334
All add'l kWh (Jun-Sept)	5,668,613	11.7210 ¢	$664,418	0.58%	$3,854	0.30%	$2,021
First 400 kWh (Oct-May)	51,185,664	7.9893 ¢	$4,089,376	0.58%	$23,718	0.30%	$12,439
All add'l kWh (Oct-May)	32,983,258	10.3725 ¢	$3,421,188	0.58%	$19,843	0.30%	$10,407
Subscriber Solar kWh	108,762	11.9126 ¢	$12,956	0.58%	$75	0.30%	$39
Subscriber Solar kWh Adj	(3,852)						
Total	134,093,072		$14,404,658		$73,384		$38,486

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 135 - Residential Service - Net Metering							
Total Customer	418,416						
Customer Charge - 1 Phase	418,038						
Single Family	405,641	$10.00	$4,056,410				
Multi Family	12,397	$6.00	$74,382				
Customer Charge - 3 Phase	378						
Single Family	112	$20.00	$2,240				
Multi Family	266	$12.00	$3,192				
Aggregate Charge	0	$2.00	$0				
Non-Standard Meter Reading Fee	14	$22.00	$308				
On-Peak kWh (Jun - Sept)	7,090	4.3560 ¢	$309	0.58%	$2	0.30%	$1
Off-Peak kWh (Jun - Sept)	44,469	(1.6334) ¢	($726)	0.58%	($4)	0.30%	($2)
First 400 kWh (Jun-Sept)	21,966,174	9.0279 ¢	$1,983,084	0.58%	$11,502	0.30%	$6,032
Next 600 kWh (Jun-Sept)	14,447,176	11.7210 ¢	$1,693,353	0.58%	$9,821	0.30%	$5,151
All add'l kWh (Jun-Sept)	7,916,923	11.7210 ¢	$927,943	0.58%	$5,382	0.30%	$2,823
First 400 kWh (Oct-May)	50,047,131	7.9893 ¢	$3,998,415	0.58%	$23,191	0.30%	$12,163
All add'l kWh (Oct-May)	47,956,842	10.3725 ¢	$4,974,323	0.58%	$28,851	0.30%	$15,131
Subscriber Solar kWh	0	11.9126 ¢	$0	0.58%	$0	0.30%	$0
Subscriber Solar kWh Adj	0						
Total	142,334,246		$17,713,233		$78,745		$41,299
Schedule No. 136 - Residential Service - Net Metering							
Total Customer	307,354						
Customer Charge - 1 Phase	307,354						
Single Family	303,609	$10.00	$3,036,090				
Multi Family	3,745	$6.00	$22,470				
Customer Charge - 3 Phase	0						
Single Family		$20.00	$0				
Multi Family		$12.00	$0				
Aggregate Charge	1,646	$2.00	$3,292				
Non-Standard Meter Reading Fee	0	$22.00	$0				
On-Peak kWh (Jun - Sept)	5,690	4.3560 ¢	$248	0.58%	$1	0.30%	$1
Off-Peak kWh (Jun - Sept)	35,358	(1.6334) ¢	($578)	0.58%	($3)	0.30%	($2)
First 400 kWh (Jun-Sept)	38,703,048	9.0279 ¢	$3,494,072	0.58%	$20,266	0.30%	$10,629
Next 600 kWh (Jun-Sept)	26,842,157	11.7210 ¢	$3,146,169	0.58%	$18,248	0.30%	$9,570
All add'l kWh (Jun-Sept)	7,600,557	11.7210 ¢	$890,861	0.58%	$5,167	0.30%	$2,710
First 400 kWh (Oct-May)	68,555,364	7.9893 ¢	$5,477,094	0.58%	$31,767	0.30%	$16,661
All add'l kWh (Oct-May)	51,108,843	10.3725 ¢	$5,301,265	0.58%	$30,747	0.30%	$16,126
Subscriber Solar kWh	0	11.9126 ¢	$0	0.58%	$0	0.30%	$0
Subscriber Solar kWh Adj	0						
Total	192,809,969		$21,370,983		$106,193		$55,695

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 6 - Composite							
Customer Charge	157,116	$53.00	$8,327,148				
Seasonal Service	0	$636.00	$0				
Minimum Charge	14	$53.00	$742				
Facilities kW	15,576,842	$3.99	$62,151,600	0.55%	$341,834	0.27%	$168,267
All kW (Jun - Sept)	6,921,590	$13.27	$91,849,499	0.55%	$505,172	0.27%	$248,671
All kW (Oct - May)	8,655,252	$11.74	$101,612,658	0.55%	$558,870	0.27%	$275,103
kWh (Jun-Sept)	2,063,156,225	3.8878 ¢	$80,211,388	0.55%	$441,163	0.27%	$217,162
kWh (Oct-May)	3,526,754,594	3.4405 ¢	$121,337,992	0.55%	$667,359	0.27%	$328,507
Voltage Discount	569,738	($0.96)	($546,948)	0.55%	($3,008)	0.27%	($1,481)
Subscriber Solar kWh	1,977,670	7.1250 ¢	$140,909	0.55%	$775	0.27%	$381
Subscriber Solar kWh Adj	25,489						
Total	5,591,913,978		$465,084,988		$2,512,165		$1,236,610
Schedule No. 6-135 - Net Metering - Composite							
Customer Charge	4,434	$53.00	$235,002				
Seasonal Service	0	$636.00	$0				
Minimum Charge	0	$53.00	$0				
Facilities kW	505,379	$3.99	$2,016,462	0.55%	$11,091	0.27%	$5,459
All kW (Jun - Sept)	206,980	$13.27	$2,746,625	0.55%	$15,106	0.27%	$7,436
All kW (Oct - May)	298,398	$11.74	$3,503,193	0.55%	$19,268	0.27%	$9,484
kWh (Jun-Sept)	60,590,666	3.8878 ¢	$2,355,644	0.55%	$12,956	0.27%	$6,378
kWh (Oct-May)	109,661,558	3.4405 ¢	$3,772,906	0.55%	$20,751	0.27%	$10,215
Voltage Discount	26,614	($0.96)	($25,549)	0.55%	($141)	0.27%	($69)
Total	170,252,223		$14,604,283		$79,031		$38,903
Schedule No. 6-136 - Net Metering - Composite							
Customer Charge	611	$53.00	$32,383				
Seasonal Service	0	$636.00	$0				
Aggregate Charge	59	$2.00	$118				
Facilities kW	94,165	$3.99	$375,718	0.55%	$2,066	0.27%	$1,017
All kW (Jun - Sept)	40,576	$13.27	$538,444	0.55%	$2,961	0.27%	$1,458
All kW (Oct - May)	53,589	$11.74	$629,135	0.55%	$3,460	0.27%	$1,703
kWh (Jun-Sept)	8,593,599	3.8878 ¢	$334,102	0.55%	$1,838	0.27%	$905
kWh (Oct-May)	15,566,358	3.4405 ¢	$535,561	0.55%	$2,946	0.27%	$1,450
Voltage Discount	0	($0.96)	$0	0.55%	$0	0.27%	$0
Total	24,159,957		$2,445,461		$13,271		$6,533

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 6B - Demand Time-of-Day Option - Composite							
Customer Charge	192	$53.00	$10,176				
Seasonal Service	0	$636.00	$0				
Minimum Charge							
Facilities kW	14,844	$3.99	$59,228	0.55%	$326	0.27%	$160
All on-peak kW (Jun - Sept)	4,915	$13.27	$65,222	0.55%	$359	0.27%	$177
All on-peak kW (Oct - May)	6,971	$11.74	$81,840	0.55%	$450	0.27%	$222
kWh (Jun-Sept)	1,281,170	3.8878 ¢	$49,809	0.55%	$274	0.27%	$135
kWh (Oct-May)	2,099,521	3.4405 ¢	$72,234	0.55%	$397	0.27%	$196
Voltage Discount	0	($0.96)	$0	0.55%	$0	0.27%	$0
Total	3,380,691		$338,509		$1,806		$890
Schedule 6 moving to 6A - Composite							
Customer Charge	16,185	$53.00	$857,783				
All kWh under 50 kWh/kW (Jun-Sept)	22,837,906	22.1562 ¢	$5,060,012	0.56%	$28,336	0.28%	$13,998
All additional kWh (Jun-Sept)	52,553,411	4.3099 ¢	$2,264,999	0.56%	$12,684	0.28%	$6,266
All kWh under 50 kWh/kW (Oct-May)	39,702,141	19.6073 ¢	$7,784,518	0.56%	$43,593	0.28%	$21,535
All additional (Oct-May)	93,250,801	3.8141 ¢	$3,556,679	0.56%	$19,917	0.28%	$9,839
On-Pk kWh (Jun-Sept)	41,868,606	6.0000 ¢	$2,512,116	0.56%	$14,068	0.28%	$6,949
Off-Pk kWh (Jun-Sept)	33,522,711	(2.3358) ¢	($783,023)	0.56%	($4,385)	0.28%	($2,166)
On-Pk kWh (Oct-May)	73,835,484	5.3097 ¢	$3,920,443	0.56%	$21,954	0.28%	$10,845
Off-Pk kWh (Oct-May)	59,117,459	(2.0671) ¢	($1,222,017)	0.56%	($6,843)	0.28%	($3,381)
Voltage Discount	56,872	($0.61)	($34,692)	0.56%	($194)	0.28%	($96)
Subscriber Solar kWh	758,838	7.1250 ¢	$54,067	0.56%	$303	0.28%	$150
Schedule 6A	209,103,098		$23,970,885		$129,433		$63,939
Customer Charge	16,185	$53.00	$857,783				
Seasonal Service	0	$636.00	$0				
Minimum Charge	0	$53.00	$0				
Facilities kW	1,281,154	$3.99	$5,111,804	0.55%	$28,115	0.27%	$13,840
All kW (Jun - Sept)	467,710	$13.27	$6,206,512	0.55%	$34,136	0.27%	$16,803
All kW (Oct - May)	813,444	$11.74	$9,549,833	0.55%	$52,524	0.27%	$25,855
kWh (Jun-Sept)	75,391,317	3.8878 ¢	$2,931,064	0.55%	$16,121	0.27%	$7,935
kWh (Oct-May)	132,952,943	3.4405 ¢	$4,574,246	0.55%	$25,158	0.27%	$12,384
Voltage Discount	56,872	($0.96)	($54,597)	0.55%	($300)	0.27%	($148)
Subscriber Solar kWh	758,838	7.1250 ¢	$54,067	0.55%	$297	0.27%	$146
Total	209,103,098		$29,230,712		$156,051		$76,815

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule 6-135 moving to 6A - Net Metering - Composite							
Customer Charge	602	$53.00	$31,904				
All kWh under 50 kWh/kW (Jun-Sept)	617,625	22.1562 ¢	$136,842	0.56%	$766	0.28%	$379
All additional kWh (Jun-Sept)	1,470,157	4.3099 ¢	$63,362	0.56%	$355	0.28%	$175
All kWh under 50 kWh/kW (Oct-May)	1,069,623	19.6073 ¢	$209,724	0.56%	$1,174	0.28%	$580
All additional (Oct-May)	2,803,066	3.8141 ¢	$106,912	0.56%	$599	0.28%	$296
On-Pk kWh (Jun-Sept)	1,159,451	6.0000 ¢	$69,567	0.56%	$390	0.28%	$192
Off-Pk kWh (Jun-Sept)	928,331	(2.3358) ¢	($21,684)	0.56%	($121)	0.28%	($60)
On-Pk kWh (Oct-May)	2,150,700	5.3097 ¢	$114,196	0.56%	$639	0.28%	$316
Off-Pk kWh (Oct-May)	1,721,989	(2.0671) ¢	($35,595)	0.56%	($199)	0.28%	($98)
Voltage Discount	0	($0.61)	$0	0.56%	$0	0.28%	$0
Subscriber Solar kWh	0	7.1250 ¢	$0	0.56%	$0	0.28%	$0
Schedule 6A	5,960,471		$675,228		$3,603		$1,780
Customer Charge	602	$53.00	$31,904				
Seasonal Service	0	$636.00	$0				
Minimum Charge	0	$53.00	$0				
Facilities kW	42,952	$3.99	$171,378	0.55%	$943	0.27%	$464
All kW (Jun - Sept)	16,126	$13.27	$213,992	0.55%	$1,177	0.27%	$579
All kW (Oct - May)	26,826	$11.74	$314,937	0.55%	$1,732	0.27%	$853
kWh (Jun-Sept)	2,218,023	3.8878 ¢	$86,232	0.55%	$474	0.27%	$233
kWh (Oct-May)	4,105,852	3.4405 ¢	$141,262	0.55%	$777	0.27%	$382
Voltage Discount	0	($0.96)	$0	0.55%	$0	0.27%	$0
Total	6,323,875		$959,705		$5,103		$2,511
Schedule 6-136 moving to 6A - Net Metering - Commercial							
Customer Charge	158	$53.00	$8,366				
All kWh under 50 kWh/kW (Jun-Sept)	446,920	22.1562 ¢	$99,020	0.56%	$555	0.28%	$274
All additional kWh (Jun-Sept)	1,064,811	4.3099 ¢	$45,892	0.56%	$257	0.28%	$127
All kWh under 50 kWh/kW (Oct-May)	604,584	19.6073 ¢	$118,543	0.56%	$664	0.28%	$328
All additional (Oct-May)	1,835,925	3.8141 ¢	$70,024	0.56%	$392	0.28%	$194
On-Pk kWh (Jun-Sept)	839,541	6.0000 ¢	$50,372	0.56%	$282	0.28%	$139
Off-Pk kWh (Jun-Sept)	672,191	(2.3358) ¢	($15,701)	0.56%	($88)	0.28%	($43)
On-Pk kWh (Oct-May)	1,355,338	5.3097 ¢	$71,964	0.56%	$403	0.28%	$199
Off-Pk kWh (Oct-May)	1,085,171	(2.0671) ¢	($22,432)	0.56%	($126)	0.28%	($62)
Voltage Discount	0	($0.61)	$0	0.56%	$0	0.28%	$0
Subscriber Solar kWh	0	7.1250 ¢	$0	0.56%	$0	0.28%	$0
Schedule 6A	3,952,240		$426,048		$2,339		$1,156
Customer Charge	158	$53.00	$8,366				
Seasonal Service	0	$636.00	$0				
Aggregate Charge	0	$53.00	$0				
Facilities kW	21,101	$3.99	$84,193	0.55%	$463	0.27%	$228
All kW (Jun - Sept)	8,990	$13.27	$119,297	0.55%	$656	0.27%	$323
All kW (Oct - May)	12,111	$11.74	$142,183	0.55%	$782	0.27%	$385
kWh (Jun-Sept)	1,511,731	3.8878 ¢	$58,773	0.55%	$323	0.27%	$159
kWh (Oct-May)	2,440,509	3.4405 ¢	$83,966	0.55%	$462	0.27%	$227
Voltage Discount	0	($0.96)	$0	0.55%	$0	0.27%	$0
Total	3,952,240		$496,778		$2,686		$1,322
Schedule 6B moving to 6A - Composite							
Customer Charge	69	$53.00	$3,665	0.56%	$21	0.28%	$10
All kWh under 50 kWh/kW (Jun-Sept)	23,181	22.1562 ¢	$5,136	0.56%	$29	0.28%	$14
All additional kWh (Jun-Sept)	32,182	4.3099 ¢	$1,387	0.56%	$8	0.28%	$4
All kWh under 50 kWh/kW (Oct-May)	59,234	19.6073 ¢	$11,614	0.56%	$65	0.28%	$32
All additional (Oct-May)	26,202	3.8141 ¢	$999	0.56%	$6	0.28%	$3
On-Pk kWh (Jun-Sept)	30,746	6.0000 ¢	$1,845	0.56%	$10	0.28%	$5
Off-Pk kWh (Jun-Sept)	24,617	(2.3358) ¢	($575)	0.56%	($3)	0.28%	($2)
On-Pk kWh (Oct-May)	47,447	5.3097 ¢	$2,519	0.56%	$14	0.28%	$7
Off-Pk kWh (Oct-May)	37,989	(2.0671) ¢	($785)	0.56%	($4)	0.28%	($2)
Voltage Discount	0	($0.61)	$0	0.56%	$0	0.28%	$0
Subscriber Solar kWh	0	7.1250 ¢	$0	0.56%	$0	0.28%	$0
Schedule 6A	140,800		$25,805		$146		$71

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Customer Charge	69	$53.00	$3,665				
Seasonal Service	0	$636.00	$0				
Minimum Charge							
Facilities kW	2,794	$3.99	$11,148	0.55%	$61	0.27%	$30
All on-peak kW (Jun - Sept)	832	$13.27	$11,041	0.55%	$61	0.27%	$30
All on-peak kW (Oct - May)	1,962	$11.74	$23,034	0.55%	$127	0.27%	$62
kWh (Jun-Sept)	55,363	3.8878 ¢	$2,152	0.55%	$12	0.27%	$6
kWh (Oct-May)	85,437	3.4405 ¢	$2,939	0.55%	$16	0.27%	$8
Voltage Discount	0	($0.96)	$0	0.55%	$0	0.27%	$0
Total	140,800		$53,979		$277		$136

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 6A - Energy Time-of-Day Option - Composite							
All kWh under 50 kWh/kW (Jun-Sept)	44,585,441	22.1562 ¢	$9,878,440	0.56%	$55,319	0.28%	$27,327
All additional kWh (Jun-Sept)	80,754,202	4.3099 ¢	$3,480,425	0.56%	$19,490	0.28%	$9,628
All kWh under 50 kWh/kW (Oct-May)	73,546,803	19.6073 ¢	$14,420,542	0.56%	$80,755	0.28%	$39,893
All additional (Oct-May)	153,778,261	3.8141 ¢	$5,865,257	0.56%	$32,845	0.28%	$16,225
On-Pk kWh (Jun-Sept)	65,422,495	6.0000 ¢	$3,925,350	0.56%	$21,982	0.28%	$10,859
Off-Pk kWh (Jun-Sept)	59,917,149	(2.3358) ¢	($1,399,545)	0.56%	($7,837)	0.28%	($3,872)
On-Pk kWh (Oct-May)	124,025,012	5.3097 ¢	$6,585,356	0.56%	$36,878	0.28%	$18,218
Off-Pk kWh (Oct-May)	103,300,051	(2.0671) ¢	($2,135,315)	0.56%	($11,958)	0.28%	($5,907)
Customer Charge	31,870	$53.00	$1,689,110				
Voltage Discount	203,454	($0.61)	($124,107)	0.56%	($695)	0.28%	($343)
Subscriber Solar kWh	29,568,815	7.1250 ¢	$2,106,778	0.56%	$11,798	0.28%	$5,828
Subscriber Solar kWh Adj	(1,649,518)						
Total	380,584,004		$44,292,291		$238,577		$117,856
Schedule No. 6A-135 - Composite							
All kWh under 50 kWh/kW (Jun-Sept)	1,790,597	22.1562 ¢	$396,728	0.56%	$2,222	0.28%	$1,097
All additional kWh (Jun-Sept)	3,521,773	4.3099 ¢	$151,785	0.56%	$850	0.28%	$420
All kWh under 50 kWh/kW (Oct-May)	5,330,608	19.6073 ¢	$1,045,188	0.56%	$5,853	0.28%	$2,891
All additional (Oct-May)	12,790,668	3.8141 ¢	$487,849	0.56%	$2,732	0.28%	$1,350
On-Pk kWh (Jun-Sept)	3,345,042	6.0000 ¢	$200,703	0.56%	$1,124	0.28%	$555
Off-Pk kWh (Jun-Sept)	1,967,328	(2.3358) ¢	($45,953)	0.56%	($257)	0.28%	($127)
On-Pk kWh (Oct-May)	10,972,800	5.3097 ¢	$582,623	0.56%	$3,263	0.28%	$1,612
Off-Pk kWh (Oct-May)	7,148,476	(2.0671) ¢	($147,766)	0.56%	($827)	0.28%	($409)
Customer Charge	1,797	$53.00	$95,241				
Voltage Discount	16,106	($0.61)	($9,825)	0.56%	($55)	0.28%	($27)
Total	23,433,646		$2,756,573		$14,905		$7,362
Schedule No. 7 - Security Area Lighting - Composite							
Level 1 (0-5,500 LED Equivalent Lumens)	80,037	$9.10	$728,334	0.54%	$3,933	0.27%	$1,938
Level 2 (5,501-12,000 LED Equivalent Lu	23,298	$10.61	$247,190	0.54%	$1,335	0.27%	$658
Level 3 (12,001 and Greater LED Equivale	31,462	$12.96	$407,743	0.54%	$2,202	0.27%	$1,085
Customers	6,491						
Total (kWh)	10,497,984		$1,383,267		$7,470		$3,681

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 8 - Composite							
Customer Charge	2,823	$71.00	$200,433				
Facilities kW	4,249,794	$4.81	$20,441,509	0.54%	$110,384	0.27%	$54,484
On-Peak kW (Jun - Sept)	1,442,193	$15.73	$22,685,696	0.54%	$122,503	0.27%	$60,465
On-Peak kW (Oct - May)	2,597,774	$13.92	$36,161,014	0.54%	$195,269	0.27%	$96,382
On-Peak kWh (Jun - Sept)	186,186,148	5.8282 ¢	$10,851,301	0.54%	$58,597	0.27%	$28,923
On-Peak kWh (Oct - May)	270,238,556	5.1577 ¢	$13,938,094	0.54%	$75,266	0.27%	$37,150
Off-Peak kWh (Jun - Sept)	524,787,623	2.9624 ¢	$15,546,309	0.54%	$83,950	0.27%	$41,436
Off-Peak kWh (Oct - May)	976,265,495	2.6216 ¢	$25,593,776	0.54%	$138,206	0.27%	$68,216
Voltage Discount	1,886,120	($1.13)	($2,131,316)	0.54%	($11,509)	0.27%	($5,681)
Total	1,957,477,822		$143,286,816		$772,666		$381,375
Schedule No. 8-135 - Commercial							
Customer Charge	168	$71.00	$11,928				
Facilities kW	150,062	$4.81	$721,798	0.54%	$3,898	0.27%	$1,924
On-Peak kW (Jun - Sept)	50,706	$15.73	$797,605	0.54%	$4,307	0.27%	$2,126
On-Peak kW (Oct - May)	91,835	$13.92	$1,278,343	0.54%	$6,903	0.27%	$3,407
On-Peak kWh (Jun - Sept)	5,879,321	5.8282 ¢	$342,659	0.54%	$1,850	0.27%	$913
On-Peak kWh (Oct - May)	8,781,642	5.1577 ¢	$452,931	0.54%	$2,446	0.27%	$1,207
Off-Peak kWh (Jun - Sept)	16,950,396	2.9624 ¢	$502,139	0.54%	$2,712	0.27%	$1,338
Off-Peak kWh (Oct - May)	31,614,263	2.6216 ¢	$828,800	0.54%	$4,476	0.27%	$2,209
Voltage Discount	85,966	($1.13)	($97,142)	0.54%	($525)	0.27%	($259)
Total	63,225,622		$4,839,061		$26,067		$12,865
Schedule No. 9 - Composite							
Customer Charge	1,872	$266.00	$497,952				
Facilities kW	8,792,631	$2.28	$20,047,199	0.54%	$108,255	0.27%	$53,455
On-Peak kW (Jun - Sept)	2,857,444	$14.33	$40,947,173	0.54%	$221,115	0.27%	$109,183
On-Peak kW (Oct - May)	5,600,405	$12.68	$71,013,135	0.54%	$383,471	0.27%	$189,352
On-Peak kWh (Jun - Sept)	337,257,779	5.1477 ¢	$17,361,019	0.54%	$93,750	0.27%	$46,292
On-Peak kWh (Oct - May)	653,220,065	4.5555 ¢	$29,757,440	0.54%	$160,690	0.27%	$79,346
Off-Peak kWh (Jun - Sept)	1,318,310,247	2.6165 ¢	$34,493,588	0.54%	$186,265	0.27%	$91,975
Off-Peak kWh (Oct - May)	2,538,543,863	2.3155 ¢	$58,779,983	0.54%	$317,412	0.27%	$156,733
Total	4,847,331,954		$272,897,489		$1,470,958		$726,336
Schedule No. 9A - Energy TOD - Composite							
Customer Charge	108	$266.00	$28,728				
Facilities Charge per kW	243,087	$2.28	$554,238	0.54%	$2,993	0.27%	$1,489
On-Peak kW (Jun - Sept)	76,062	$4.73	$359,773	0.54%	$1,943	0.27%	$967
On-Peak kW (Oct - May)	169,650	$4.18	$709,137	0.54%	$3,829	0.27%	$1,906
On-Peak kWh (Jun - Sept)	6,818,306	5.1477 ¢	$350,986	0.54%	$1,895	0.27%	$943
On-Peak kWh (Oct - May)	7,138,084	4.5555 ¢	$325,175	0.54%	$1,756	0.27%	$874
Off-Peak kWh (Jun - Sept)	5,708,900	2.6165 ¢	$149,373	0.54%	$807	0.27%	$401
Off-Peak kWh (Oct - May)	22,274,997	2.3155 ¢	$515,778	0.54%	$2,785	0.27%	$1,386
Total	41,940,288		$2,993,188		$16,008		$7,966

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 10 - Irrigation							
Annual Cust. Serv. Chg. - Primary	10	$122.00	$1,220				
Annual Cust. Serv. Chg. - Secondary	3,273	$37.00	$121,101				
Monthly Cust. Serv. Chg.	14,850	$14.00	$207,900				
All On-Season kW	425,282	$7.14	$3,036,513	0.55%	$16,701	0.27%	$8,256
Voltage Discount	4,699	($2.05)	($9,633)	0.55%	($53)	0.27%	($26)
First 30,000 kWh	90,734,008	7.1126 ¢	$6,453,547	0.55%	$35,495	0.27%	$17,546
All add'l kWh	54,847,557	5.2573 ¢	$2,883,501	0.55%	$15,859	0.27%	$7,840
Total On Season	145,581,565		$12,694,149		$68,002		$33,616
Post Season							
Customer Charge	7,027	$14.00	$98,378				
kWh	51,252,091	4.8789 ¢	$2,500,538	0.55%	$13,753	0.27%	$6,799
Total Post Season	51,252,091		$2,598,916		$13,753		$6,799
TOTAL RATE 10	196,833,656		$15,293,065		$81,755		$40,415
Schedule No. 10-135 - Irrigation							
Annual Cust. Serv. Chg. - Primary	1	$122.00	$122				
Annual Cust. Serv. Chg. - Secondary	55	$37.00	$2,035				
Monthly Cust. Serv. Chg.	285	$14.00	$3,990				
All On-Season kW	26,155	$7.14	$186,747	0.55%	$1,027	0.27%	$508
Voltage Discount	10	($2.05)	($21)	0.55%	$0	0.27%	$0
First 30,000 kWh	3,703,888	7.1126 ¢	$263,443	0.55%	$1,449	0.27%	$716
All add'l kWh	3,271,622	5.2573 ¢	$171,999	0.55%	$946	0.27%	$468
On-Peak kWh	132,217	14.0520 ¢	$18,579	0.55%	$102	0.27%	$51
Off-Peak kWh	494,707	4.0492 ¢	$20,032	0.55%	$110	0.27%	$54
Total On Season	7,602,434		$666,926		$3,634		$1,797
Post Season							
Customer Charge	123	$14.00	$1,722				
kWh	1,697,996	4.8789 ¢	$82,844	0.55%	$456	0.27%	$225
Total Post Season	1,697,996		$84,566		$456		$225
TOTAL RATE 10-135	9,300,430		$751,492		$4,090		$2,022
Schedule No. 10-TOD							
Annual Cust. Serv. Chg. - Primary	3	$122.00	$366				
Annual Cust. Serv. Chg. - Secondary	266	$37.00	$9,842				
Monthly Cust. Serv. Chg.	1,196	$14.00	$16,744				
All On-Season kW	63,002	$7.14	$449,834	0.55%	$2,474	0.27%	$1,223
Voltage Discount kW	2,363	($2.05)	($4,844)	0.55%	($27)	0.27%	($13)
On-Peak kWh	4,395,923	14.0520 ¢	$617,715	0.55%	$3,397	0.27%	$1,679
Off-Peak kWh	13,428,677	4.0492 ¢	$543,754	0.55%	$2,991	0.27%	$1,478
Total On Season	17,824,600		$1,633,411		$8,835		$4,367
Post Season							
Customer Charge	605	$14.00	$8,470				
kWh	6,433,787	4.8789 ¢	$313,898	0.55%	$1,726	0.27%	$853
Total Post Season	6,433,787		$322,368		$1,726		$853
TOTAL RATE 10-TOD	24,258,387		$1,955,779		$10,561		$5,220

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 11 - Street Lighting - Company-Owned System							
Functional Lighting							
Level 1 (0-3,500 LED Equivalent Lumens)	32,060	$11.82	$378,953	0.54%	$2,046	0.27%	$1,009
Level 2 (3,501-5,500 LED Equivalent Lun	197,233	$12.74	$2,512,752	0.54%	$13,569	0.27%	$6,688
Level 3 (5,501-8,000 LED Equivalent Lun	20,644	$13.19	$272,290	0.54%	$1,470	0.27%	$725
Level 4 (8,001-12,000 LED Equivalent Lu	574	$13.71	$7,871	0.54%	$43	0.27%	$21
Level 5 (12,001-15,500 LED Equivalent L	22,536	$14.60	$329,020	0.54%	$1,777	0.27%	$876
Level 6 (15,501 and Greater LED Equivale	7,800	$17.75	$138,445	0.54%	$748	0.27%	$368
Decorative Series							
Level 3 (5,501-8,000 LED Equivalent Lun	5,104	$23.15	$118,165	0.54%	$638	0.27%	$315
Customer-Funded Conversion							
Level 1 (0-3,500 LED Equivalent Lumens)	0	$6.04	$0	0.54%	$0	0.27%	$0
Level 2 (3,501-5,500 LED Equivalent Lun	276	$6.57	$1,813	0.54%	$10	0.27%	$5
Level 3 (5,501-8,000 LED Equivalent Lun	0	$6.99	$0	0.54%	$0	0.27%	$0
Level 4 (8,001-12,000 LED Equivalent Lu	0	$7.46	$0	0.54%	$0	0.27%	$0
Level 5 (12,001-15,500 LED Equivalent L	12	$8.00	$96	0.54%	$1	0.27%	$0
Level 6 (15,501 and Greater LED Equivale	0	$9.72	$0	0.54%	$0	0.27%	$0
Customer-Funded Conversion Decorative Series							
Level 3 (5,501-8,000 LED Equivalent Lun	0	$5.52	$0	0.54%	$0	0.27%	$0
Customers	715						
Total	13,572,508		$3,759,405		$20,302		$10,007
Schedule No. 12 - Street Lighting - Customer-Owned System							
1. Energy Only, No Maintenance							
High Pressures Sodium Vapor Lamps							
5,600 Lumen	51,176	$1.33	$68,064	0.54%	$368	0.27%	$181
9,500 Lumen	80,459	$1.81	$145,631	0.54%	$786	0.27%	$388
16,000 Lumen	67,482	$2.65	$178,827	0.54%	$966	0.27%	$476
27,500 Lumen	17,154	$4.73	$81,138	0.54%	$438	0.27%	$216
50,000 Lumen	10,092	$7.27	$73,369	0.54%	$396	0.27%	$195
Metal Halide Lamps							
9,000 Lumen	4,369	$1.85	$8,083	0.54%	$44	0.27%	$22
12,000 Lumen	9,335	$3.24	$30,245	0.54%	$163	0.27%	$80
19,500 Lumen	10,137	$4.48	$45,414	0.54%	$245	0.27%	$121
32,000 Lumen	6,173	$7.09	$43,767	0.54%	$236	0.27%	$116
Non-listed Luminaries kWh	9,608,182	4.5465 ¢	$436,836	0.54%	$2,359	0.27%	$1,163

Rocky Mountain Power - State of Utah
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Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
2a - Partial Maintenance (No New Service)							
Incandescent Lamps							
2,500 Lumen or Less	46	$6.50	$299	0.54%	$2	0.27%	$1
4,000 Lumen	23	$8.84	$203	0.54%	$1	0.27%	$1
Mercury Vapor Lamps							
4,000 Lumen	0	$3.37	$0	0.54%	$0	0.27%	$0
7,000 Lumen	404	$5.08	$2,052	0.54%	$11	0.27%	$5
20,000 Lumen	53	$9.67	$513	0.54%	$3	0.27%	$1
54,000 Lumen	0	$20.59	$0	0.54%	$0	0.27%	$0
High Pressure Sodium Vapor Lamps							
5,600 Lumen	1,416	$2.96	$4,191	0.54%	$23	0.27%	$11
9,500 Lumen	6,699	$3.90	$26,126	0.54%	$141	0.27%	$70
9,500 Lumen - Decorative	3,869	$5.05	$19,538	0.54%	$106	0.27%	$52
16,000 Lumen	586	$4.73	$2,772	0.54%	$15	0.27%	$7
16,000 Lumen - Decorative	269	$6.00	$1,614	0.54%	$9	0.27%	$4
22,000 Lumen	0	$5.99	$0	0.54%	$0	0.27%	$0
27,500 Lumen	1,740	$6.96	$12,110	0.54%	$65	0.27%	$32
27,500 Lumen - Decorative	77	$8.65	$666	0.54%	$4	0.27%	$2
50,000 Lumen	4,562	$10.15	$46,304	0.54%	$250	0.27%	$123
50,000 Lumen - Decorative	76	$11.29	$858	0.54%	$5	0.27%	$2
Metal Halide Lamps							
9,000 Lumen - Decorative	587	$6.67	$3,915	0.54%	$21	0.27%	$10
12,000 Lumen	847	$9.84	$8,334	0.54%	$45	0.27%	$22
12,000 Lumen - Decorative	130	$8.04	$1,045	0.54%	$6	0.27%	$3
19,500 Lumen	244	$9.94	$2,425	0.54%	$13	0.27%	$6
19,500 Lumen - Decorative	3,676	$10.25	$37,679	0.54%	$203	0.27%	$100
32,000 Lumen	122	$10.58	$1,291	0.54%	$7	0.27%	$3
32,000 Lumen - Decorative	352	$11.45	$4,030	0.54%	$22	0.27%	$11
Fluorescent Lamps							
1,000 Lumen	0	$2.72	$0	0.54%	$0	0.27%	$0
21,800 Lumen	53	$10.10	$535	0.54%	$3	0.27%	$1

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
2b - Full Maintenance (No New Service)							
Incandescent Lamps							
6,000 Lumen	37	$12.86	$476	0.54%	$3	0.27%	$1
10,000 Lumen	12	$16.97	$204	0.54%	$1	0.27%	$1
Mercury Vapor Lamps							
7,000 Lumen	25	$5.82	$146	0.54%	$1	0.27%	$0
20,000 Lumen	0	$11.10	$0	0.54%	$0	0.27%	$0
54,000 Lumen	0	$23.56	$0	0.54%	$0	0.27%	$0
Sodium Vapor Lamps							
5,600 Lumen	4,183	$3.39	$14,180	0.54%	$77	0.27%	$38
9,500 Lumen	7,164	$4.47	$32,023	0.54%	$173	0.27%	$85
16,000 Lumen	597	$5.42	$3,236	0.54%	$17	0.27%	$9
22,000 Lumen	0	$6.85	$0	0.54%	$0	0.27%	$0
27,500 Lumen	1,267	$7.97	$10,098	0.54%	$55	0.27%	$27
50,000 Lumen	1,657	$11.62	$19,254	0.54%	$104	0.27%	$51
Metal Halide Lamps							
12,000 Lumen	35	$11.30	$396	0.54%	$2	0.27%	$1
19,500 Lumen	748	$11.41	$8,535	0.54%	$46	0.27%	$23
32,000 Lumen	697	$12.13	$8,455	0.54%	$46	0.27%	$23
107,000 Lumen	0	$23.97	$0	0.54%	$0	0.27%	$0
Customers	1,229						
Total	26,868,874		$1,384,878		$7,481		$3,684
Schedule 15.1 - Metered Outdoor Nighttime Lighting - Composite							
Annual Facility Charge	21,139	$7.00	$147,973				
Annual Customer Charge	638	$49.02	$31,275				
Annual Minimum Charge	0	$84.02	$0				
Monthly Customer Charge	7,644	$4.19	$32,028				
All kWh	15,963,151	3.5697 ¢	$569,837	0.71%	$4,046	0.36%	$2,079
Total	15,963,151		$781,113		$4,046		$2,079
Schedule 15.2 - Traffic Signal Systems - Composite							
Customer Charge	32,811	$5.50	$180,461				
All kWh	7,776,370	8.0005 ¢	$622,149	0.71%	$4,417	0.34%	$2,136
Total	7,776,370		$802,610		$4,417		$2,136

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Base Period 12 Months Ending December 2019
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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 21 - Electric Furnace Operations - Limited Service - Industrial							
Schedule 6A							
Customer Charge	15	$53.00	$795				
Voltage Discount	0	($0.61)	$0	0.56%	$0	0.28%	$0
All kWh under 50 kWh/kW (Jun-Sept)	82,148	22.1562 ¢	$18,201	0.56%	$102	0.28%	$50
All additional kWh (Jun-Sept)	0	4.3099 ¢	$0	0.56%	$0	0.28%	$0
All kWh under 50 kWh/kW (Oct-May)	156,310	19.6073 ¢	$30,648	0.56%	$172	0.28%	$85
All additional (Oct-May)	0	3.8141 ¢	$0	0.56%	$0	0.28%	$0
On-Pk kWh (Jun-Sept)	45,621	6.0000 ¢	$2,737	0.56%	$15	0.28%	$8
Off-Pk kWh (Jun-Sept)	36,527	(2.3358) ¢	($853)	0.56%	($5)	0.28%	($2)
On-Pk kWh (Oct-May)	86,807	5.3097 ¢	$4,609	0.56%	$26	0.28%	$13
Off-Pk kWh (Oct-May)	69,503	(2.0671) ¢	($1,437)	0.56%	($8)	0.28%	($4)
	238,458		$54,700		$302		$150
Schedule 9							
Customer Charge	21	$266.00	$5,586				
Facilities kW	25,596	$2.28	$58,358	0.54%	$315	0.27%	$156
On-Peak kW (Jun - Sept)	8,668	$14.33	$124,208	0.54%	$671	0.27%	$331
On-Peak kW (Oct - May)	16,941	$12.68	$214,810	0.54%	$1,160	0.27%	$573
On-Peak kWh (Jun - Sept)	91,666	5.1477 ¢	$4,719	0.54%	$25	0.27%	$13
On-Peak kWh (Oct - May)	244,288	4.5555 ¢	$11,129	0.54%	$60	0.27%	$30
Off-Peak kWh (Jun - Sept)	362,605	2.6165 ¢	$9,488	0.54%	$51	0.27%	$25
Off-Peak kWh (Oct - May)	900,095	2.3155 ¢	$20,842	0.54%	$113	0.27%	$56
	1,598,654		$449,140		$2,395		$1,184
Total	1,837,112		$503,840		$2,697		$1,334

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No.22 - Indoor Agricultural Lighting Service – 1,000 kW and Over							
Customer Service Charge							
Secondary		$72.00					
Primary		$72.00					
Transmission		$266.00					
Facilities Charge All kW							
Secondary		$1.41		0.55%		0.27%	
Primary		$1.41		0.55%		0.27%	
Transmission		$1.41		0.55%		0.27%	
Power Charge							
Secondary							
Summer-On Peak kW		$8.38		0.55%		0.27%	
Winter-On Peak kW		$6.02		0.55%		0.27%	
Primary							
Summer-On Peak kW		$8.26		0.55%		0.27%	
Winter-On Peak kW		$5.76		0.55%		0.27%	
Transmission							
Summer-On Peak kW		$8.04		0.55%		0.27%	
Winter-On Peak kW		$5.45		0.55%		0.27%	
Energy Charge							
Secondary							
Summer-On Peak kWh		9.4763 ¢		0.55%		0.27%	
Summer-Off Peak kWh		5.2117 ¢		0.55%		0.27%	
Winter-On Peak kWh		4.2199 ¢		0.55%		0.27%	
Winter-Off Peak kWh		3.5267 ¢		0.55%		0.27%	
Primary							
Summer-On Peak kWh		9.0959 ¢		0.55%		0.27%	
Summer-Off Peak kWh		4.8313 ¢		0.55%		0.27%	
Winter-On Peak kWh		3.8394 ¢		0.55%		0.27%	
Winter-Off Peak kWh		3.1463 ¢		0.55%		0.27%	
Transmission							
Summer-On Peak kWh		8.8978 ¢		0.55%		0.27%	
Summer-Off Peak kWh		4.6331 ¢		0.55%		0.27%	
Winter-On Peak kWh		3.6414 ¢		0.55%		0.27%	
Winter-Off Peak kWh		2.9483 ¢		0.55%		0.27%	
Total			$0		$0		$0
Schedule No. 23 - Composite							
Customer Charge	1,134,470	$10.00	$11,344,703				
Seasonal Service	0	$117.00	$0				
Minimum Charge	102	$10.00	$1,020				
kW over 15 (Jun - Sept)	303,570	$8.89	$2,698,737	0.58%	$15,653	0.29%	$7,839
kW over 15 (Oct - May)	353,344	$7.87	$2,780,817	0.58%	$16,129	0.29%	$8,077
First 1,500 kWh (Jun - Sept)	245,732,054	11.7120 ¢	$28,780,138	0.58%	$166,925	0.29%	$83,593
All Add'l kWh (Jun - Sept)	255,089,575	6.5567 ¢	$16,725,458	0.58%	$97,008	0.29%	$48,580
First 1,500 kWh (Oct - May)	491,138,812	10.3646 ¢	$50,904,573	0.58%	$295,247	0.29%	$147,854
All Add'l kWh (Oct - May)	394,638,630	5.8024 ¢	$22,898,512	0.58%	$132,811	0.29%	$66,510
Voltage Discount	11,994	($0.48)	($5,757)	0.58%	($33)	0.29%	($17)
Subscriber Solar kWh	2,069,676	10.3811 ¢	$214,855	0.58%	$1,246	0.29%	$624
Subscriber Solar kWh Adj	(150,134)						
Total	1,388,518,613		$136,343,056		$724,986		$363,060

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Blocking Based on Adjusted Actuals and Forecasted Loads
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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No. 23-135 - Composite							
Customer Charge	18,738	$10.00	$187,380				
Seasonal Service	0	$117.00	$0				
Minimum Charge	10	$10.00	$100				
kW over 15 (Jun - Sept)	6,794	$8.89	$60,399	0.58%	$350	0.29%	$175
kW over 15 (Oct - May)	9,813	$7.87	$77,228	0.58%	$448	0.29%	$224
First 1,500 kWh (Jun - Sept)	2,193,840	11.7120 ¢	$256,943	0.58%	$1,490	0.29%	$746
All Add'l kWh (Jun - Sept)	2,240,351	6.5567 ¢	$146,893	0.58%	$852	0.29%	$427
First 1,500 kWh (Oct - May)	5,247,056	10.3646 ¢	$543,836	0.58%	$3,154	0.29%	$1,580
All Add'l kWh (Oct - May)	4,722,287	5.8024 ¢	$274,006	0.58%	$1,589	0.29%	$796
Voltage Discount	0	($0.48)	$0	0.58%	$0	0.29%	$0
Total	14,403,534		$1,546,785		$7,883		$3,948
Schedule No. 23-136 - Composite							
Customer Charge	1,546	$10.00	$15,460				
Seasonal Service	0	$117.00	$0				
Aggregate Charge	393	$2.00	$786				
Minimum Charge	0	$10.00	$0				
kW over 15 (Jun - Sept)	552	$8.89	$4,907	0.58%	$28	0.29%	$14
kW over 15 (Oct - May)	982	7.8700	$7,728	0.58%	$45	0.29%	$22
First 1,500 kWh (Jun - Sept)	228,752	11.7120 ¢	$26,791	0.58%	$155	0.29%	$78
All Add'l kWh (Jun - Sept)	234,472	6.5567 ¢	$15,374	0.58%	$89	0.29%	$45
First 1,500 kWh (Oct - May)	417,772	10.3646 ¢	$43,300	0.58%	$251	0.29%	$126
All Add'l kWh (Oct - May)	648,715	5.8024 ¢	$37,641	0.58%	$218	0.29%	$109
Voltage Discount	0	($0.48)	$0	0.58%	$0	0.29%	$0
Total	1,529,711		$151,987		$786		$394

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		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Schedule No.31 - Composite							
Secondary Voltage							
Customer Charge per month	0	$137.00	$0				
Facilities Charge, per kW month	0	$5.75	$0	0.55%	$0	0.27%	$0
Back-up Power Charge							
Regular, per On-Peak kW day							
Jun - Sept	0	$0.90	$0	0.55%	$0	0.27%	$0
Oct - May	0	$0.80	$0	0.55%	$0	0.27%	$0
Maintenance, per On-Peak kW day							
Jun - Sept	0	$0.45	$0	0.55%	$0	0.27%	$0
Oct - May	0	$0.40	$0	0.55%	$0	0.27%	$0
Excess Power, per kW month							
Jun - Sept	0	$41.89	$0	0.55%	$0	0.27%	$0
Oct - May	0	$37.07	$0	0.55%	$0	0.27%	$0
Primary Voltage							
Customer Charge per month	25	$621.00	$15,525				
Facilities Charge, per kW month	34,929	$4.58	$159,975	0.55%	$880	0.27%	$433
Back-up Power Charge							
Regular, per On-Peak kW day							
Jun - Sept	67,470	$0.88	$59,374	0.55%	$327	0.27%	$161
Oct - May	47,316	$0.78	$36,906	0.55%	$203	0.27%	$100
Maintenance, per On-Peak kW day							
Jun - Sept	1,510	$0.44	$664	0.55%	$4	0.27%	$2
Oct - May	0	$0.39	$0	0.55%	$0	0.27%	$0
Excess Power, per kW month							
Jun - Sept	142	$39.56	$5,618	0.55%	$31	0.27%	$15
Oct - May	655	$35.01	$22,932	0.55%	$126	0.27%	$62
Transmission Voltage							
Customer Charge per month	59	$696.00	$41,064				
Facilities Charge, per kW month	291,905	$2.70	$788,144	0.55%	$4,335	0.27%	$2,135
Back-up Power Charge							
Regular, per On-Peak kW day							
Jun - Sept	657,860	$0.78	$513,131	0.55%	$2,822	0.27%	$1,390
Oct - May	307,104	$0.69	$211,902	0.55%	$1,165	0.27%	$574
Maintenance, per On-Peak kW day							
Jun - Sept	0	$0.39	$0	0.55%	$0	0.27%	$0
Oct - May	150,561	$0.35	$51,944	0.55%	$286	0.27%	$141
Excess Power, per kW month							
Jun - Sept	6,767	$33.21	$224,732	0.55%	$1,236	0.27%	$609
Oct - May	1,067	$29.39	$31,359	0.55%	$172	0.27%	$85
Subtotal			$2,163,270		$11,587		$5,707

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	Forecasted Units	Present Price	Present Revenue Dollars	Sch 196 Price	Sch 196 Revenue Dollars	Proposed Sch 198 Price	Proposed Sch 198 Revenue Dollars
Supplemental billed at Schedule 8/9 rate							
Schedule 8							
Facilities kW	27,799	$4.81	$133,713	0.54%	$722	0.27%	$356
On-Peak kW (Jun - Sept)	2,699	$15.73	$42,455	0.54%	$229	0.27%	$113
On-Peak kW (Oct - May)	26,884	$13.92	$374,225	0.54%	$2,021	0.27%	$997
On-Peak kWh (Jun - Sept)	905,085	5.8282 ¢	$52,750	0.54%	$285	0.27%	$141
On-Peak kWh (Oct - May)	2,558,532	5.1577 ¢	$131,961	0.54%	$713	0.27%	$352
Off-Peak kWh (Jun - Sept)	4,024,260	2.9624 ¢	$119,215	0.54%	$644	0.27%	$318
Off-Peak kWh (Oct - May)	7,522,766	2.6216 ¢	$197,217	0.54%	$1,065	0.27%	$526
Voltage Discount	27,713	($1.13)	($31,316)	0.54%	($169)	0.27%	($83)
Schedule 9			$1,020,220		$5,510		$2,720
Facilities kW	283,278	$2.28	$645,874	0.54%	$3,488	0.27%	$1,722
On-Peak kW (Jun - Sept)	96,907	$14.33	$1,388,677	0.54%	$7,499	0.27%	$3,703
On-Peak kW (Oct - May)	180,946	$12.68	$2,294,395	0.54%	$12,390	0.27%	$6,118
On-Peak kWh (Jun - Sept)	14,609,917	5.1477 ¢	$752,075	0.54%	$4,061	0.27%	$2,005
On-Peak kWh (Oct - May)	21,736,230	4.5555 ¢	$990,194	0.54%	$5,347	0.27%	$2,640
Off-Peak kWh (Jun - Sept)	47,389,695	2.6165 ¢	$1,239,951	0.54%	$6,696	0.27%	$3,306
Off-Peak kWh (Oct - May)	90,512,658	2.3155 ¢	$2,095,821	0.54%	$11,317	0.27%	$5,588
			$9,406,987		$50,798		$25,082
Total (Aggregated)	189,259,143		$12,590,477		$67,895		$33,509
Schedule 32 - Service From Renewable Energy Facilities - Commercial							
Customer Charges:							
Distribution Voltage < 1 MW		$55.00	$0				
Distribution Voltage > 1 MW		$72.00	$0				
Transmission Voltage	36	$266.00	$9,576				
Administrative Fee:							
All Voltages / per Generator	13	$113.00	$1,451				
All Voltages / per Delivery Point	39	$154.00	$5,932				
Delivery Facilities Charges:							
Secondary Voltage < 1 MW		$7.52	$0	0.55%	$0	0.27%	$0
Primary Voltage < 1 MW		$6.56	$0	0.55%	$0	0.27%	$0
Secondary Voltage > 1 MW		$8.37	$0	0.55%	$0	0.27%	$0
Primary Voltage > 1 MW		$7.24	$0	0.55%	$0	0.27%	$0
Transmission Voltage	245,396	$4.35	$1,067,470	0.55%	$5,871	0.27%	$2,861
Daily Power Charges:							
On-Peak Secondary Voltage < 1 MW							
June - September:		$0.57	$0	0.55%	$0	0.27%	$0
October - May:		$0.48	$0	0.55%	$0	0.27%	$0
On-Peak Primary Voltage < 1 MW							
June - September:		$0.57	$0	0.55%	$0	0.27%	$0
October - May:		$0.47	$0	0.55%	$0	0.27%	$0
On-Peak Secondary Voltage > 1 MW							
June - September:		$0.72	$0	0.55%	$0	0.27%	$0
October - May:		$0.61	$0	0.55%	$0	0.27%	$0
On-Peak Primary Voltage > 1 MW							
June - September:		$0.71	$0	0.55%	$0	0.27%	$0
October - May:		$0.59	$0	0.55%	$0	0.27%	$0
On-Peak Transmission Voltage							
June - September:	526,626	$0.71	$373,905	0.55%	$2,056	0.27%	$1,002
October - May:	913,271	$0.61	$557,095	0.55%	$3,064	0.27%	$1,493
Renewable Energy PPA	172,556,857	5.7290 ¢	$9,885,782				
Subtotal	172,556,857		$11,901,211		$10,991		$5,356

Rocky Mountain Power - State of Utah
Blocking Based on Adjusted Actuals and Forecasted Loads
Base Period 12 Months Ending December 2019
Forecast Period 12 Months Ending December 2021

		Present		Sch 196		Proposed Sch 198	
	Forecasted Units	Price	Revenue Dollars	Price	Revenue Dollars	Price	Revenue Dollars
Supplemental billed at Schedule 8/9 rate							
Schedule 9							
Facilities kW	41,883	$2.28	$95,492	0.54%	$516	0.27%	$255
On-Peak kW (Jun - Sept)	15,180	$14.33	$217,530	0.54%	$1,175	0.27%	$580
On-Peak kW (Oct - May)	26,325	$12.68	$333,802	0.54%	$1,803	0.27%	$890
On-Peak kWh (Jun - Sept)	4,703,542	5.1477 ¢	$242,124	0.54%	$1,307	0.27%	$646
On-Peak kWh (Oct - May)	4,209,024	4.5555 ¢	$191,742	0.54%	$1,035	0.27%	$511
Off-Peak kWh (Jun - Sept)	6,552,517	2.6165 ¢	$171,447	0.54%	$926	0.27%	$457
Off-Peak kWh (Oct - May)	8,628,050	2.3155 ¢	$199,782	0.54%	$1,079	0.27%	$533
Subtotal			$1,451,919		$7,841		$3,872
Total (Aggregated)	196,649,990		$13,353,130		$18,832		$9,228
Schedule 34 - Renewable Energy Purchases for Qualified Customers – 5,000 kW and Over - Commercial							
Customer Charge	12						
System Facilities Charge	230,623	$5.08	$1,171,565				
All other charge	242,230,000	4.8946 ¢	$11,856,193				
Total	242,230,000	5.3783 ¢	$13,027,758				
Contract 1							
Monthly Fixed Charge	12	$232.00	$2,784				
Customer Charge per HLH kW	1,004,562	$1.92	$1,928,759				
Demand Charge per HLH kW (May - Sep	381,956	$12.93	$4,938,691				
Demand Charge per HLH kW (Oct - Apr	622,606	$8.67	$5,397,994				
kWh HLH (May - Sept)	101,240,704	4.3940 ¢	$4,448,517				
kWh LLH (May - Sept)	142,951,672	2.7600 ¢	$3,945,466				
kWh HLH (Oct - Apr)	168,476,287	3.3060 ¢	$5,569,826				
kWh LLH (Oct - Apr)	204,431,337	2.7600 ¢	$5,642,305				
Total	617,100,000		$31,874,342				
Contract 2							
Customer Charge	12						
On-Peak kWh (May-Sept)	57,264,151	6.5680 ¢	$3,761,109				
On-Peak kWh (Oct-Apr)	179,663,027	4.9410 ¢	$8,877,150				
Off-Peak kWh (May - Sept)	239,492,626	4.1280 ¢	$9,886,256				
Off-Peak kWh (Oct-Apr)	229,035,745	4.1280 ¢	$9,454,596				
Total	705,455,549		$31,979,111				
Contract 3							
Customer Charge	12						
Block 1	376,680,000	5.8419 ¢	$22,005,408				
Block 2 - Market							
Block 2 - Index	911,946,197	4.4906 ¢	$40,952,185				
Total	1,288,626,197		$62,957,593				
Lighting Contract - Post Top Lighting - Composite							
Customers	4						
Energy Only Res	48	$2.1800	$105				
Energy Only Non-Res	207	$2.1858	$452				
Subtotal	255		$557				
Total	7,387		$557				
Annual Guarantee Adjustment							
Residential			$6,795				
Commercial			$3,742,344				
Industrial			$823,370				
Irrigation			$231,623				
Public Street & Highway Lighting			$4,655				
Total AGA			$4,808,787		$0		$0
TOTAL - ALL CLASSES	24,837,388,161		$2,033,151,315		$9,886,183		$4,999,743